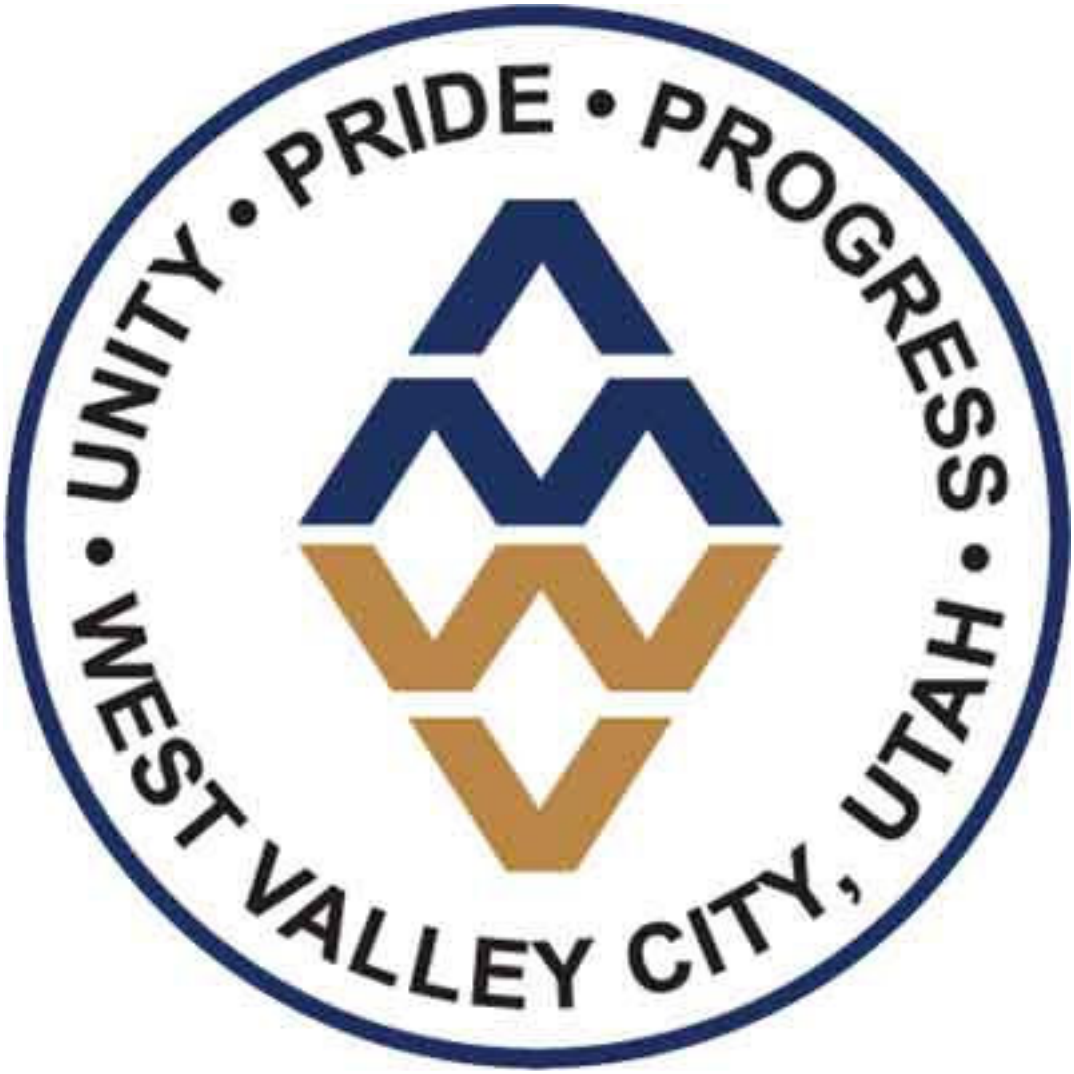


Hazard Mitigation Plan (2014)

ANNEX O: WEST VALLEY CITY
1 Introduction

1.1 Background

This Mitigation Plan is a revision of the Wasatch Front Regional Council Natural Hazard Pre-Disaster Mitigation Plan (WFRC PDM) and crosswalk completed in 2009 with the intent to create a standalone mitigation plan for West Valley City. The goal of this Plan is to assist the 16 municipalities and partner agencies within Salt Lake County in reducing the costs of natural disasters by providing comprehensive hazards identification, risk assessment, vulnerability analysis, mitigation strategies, and an implementation schedule.

The WFRC plan was reviewed to evaluate its strengths, weakness and utility. The hazards, vulnerabilities and risks were reviewed and revised as to their impact, how hazards may affect the population, and their severity. Updates also describe hazard impacts that have occurred since the last plan revision. The planning team considered previously unidentified hazards to include in the plan update. A capabilities assessment was conducted to identify potential mitigation needs and to further align the mitigation plan with other community planning efforts. The revision process also included a review of proposed mitigation goals, objectives and actions and to determine their validity and how effective they have been/or will be at reducing vulnerability in the county. New priorities have been set to support changes that were identified. The Mitigation Plan was also evaluated to support the State Mitigation Plan goals and objectives, as well as other local planning efforts. Finally, an implementation strategy and timeline will assign the responsibility and schedule for tracking implementation of the identified mitigation actions. The Mitigation Plan will be adopted pursuant to Federal Law and will establish authority and guide all mitigation activities outlined in the plan.

West Valley City is vulnerable to natural and technological (human-caused) hazards that threaten the health, welfare, and security of our citizens. Action taken to reduce or eliminate the long-term risk to human life and property from these hazards is known as mitigation. The losses and life and property, as well as the cost of response to and recovery, from potential disasters can be substantially reduced when attention is turned to mitigation of the impacts and effects before they occur or re-occur.

Hazard mitigation planning is the process of identifying hazard risks and vulnerabilities, and establishing goals, policies, and procedures to implement risk-reducing actions. This plan represents a collaborative effort of many participants in our community with the mission to

engage community stakeholders in developing a comprehensive approach to reduce long-term hazard risk by identifying and implementing effective mitigation strategies.

Mitigation planning creates safer communities by reducing loss of life and property damage, and protecting community assets from the negative impacts of hazards. Implementing mitigation strategies can also reduce the cost of disaster response and recovery by:

- Identifying cost-effective actions that reduce risk
- Focusing resources on the greatest vulnerabilities
- Building partnerships between jurisdictions
- Increasing public awareness of hazards and risk
- Communicating planning priorities
- Aligning risk-reduction efforts with other community plans and objectives
- Establishing eligibility for mitigation grant programs.

Hazard mitigation is any cost-effective action that has the effect of reducing, limiting, or preventing vulnerability of people, property and/or the environment to potentially damaging, harmful, or costly hazards. Hazard mitigation actions, which can be used to eliminate or minimize the risk to life and property, fall into three categories:

1. Those that keep the hazard away from people
2. Those that keep people, property, and structures away from the hazard
3. Those that do not address the hazard, but rather reduce the impact of the hazard on the victims, such as insurance.

Local mitigation plans are required to be updated every five years. This plan will be an update to the Wasatch Front Regional Council Natural Hazard Pre-Disaster Mitigation Plan (WFRD PDM) that West Valley City participated in during 2008-2009. The Mitigation Plan is a collaborative effort which will serve all of West Valley City, including each of the 16 cities, as well as special service districts within the county. The revision of this plan supports the State Hazard Mitigation Plan mission which states, “to permanently reduce the regions vulnerability to natural hazards”. The Plan is intended to promote sound public policy and protect or reduce the vulnerability of the citizens, critical facilities, infrastructure, private property and the natural environment within the region.” The framework of this plan will now serve as a tool to guide, plan, and allocate resources across multi-jurisdictional boundaries. It will assist jurisdictions in making good assessments of their resilience to disasters and disruptions. It will serve as a guide to prioritize mitigation and preparedness efforts, allocate funding, and guide development in innovative ways to effectively utilize and share scarce resources. It is a representation of the West Valley City’s commitment to reduce risks from natural hazards.

1.2 Purpose

The four purposes of this Plan are (1) to identify threats to the community, (2) to create mitigation strategies to address those threats, (3) to develop long-term mitigation planning goals and objectives, and (4) and to fulfill federal, state and local hazard mitigation planning obligations. Mitigation actions, in particular, would serve to minimize conditions that have an undesirable impact on our citizens, the economy, environment and the well-being of West Valley City and surrounding municipalities. This Plan is intended to enhance the awareness for elected officials, agencies and the public of these hazards and their associated threat to life and property. The Plan also details what actions can be taken to help prevent or reduce hazard vulnerability to each jurisdiction. West Valley City prepared this local hazard mitigation plan to guide hazard mitigation planning to better protect the people and property from the effects of hazard events. This plan demonstrates the community's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This plan was also developed to make West Valley City eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program and Pre-Disaster Mitigation program, and to earn points for the National Flood Insurance Program's Community Rating System (CRS), which could lower flood insurance premiums in CRS communities.

1.3 Scope

The plan utilizes current County, City, and applicable private hazard mitigation, emergency operations plans, census data and available GIS and assessor's data as resources for the planning team. West Valley City Emergency Management staff, planning team members, county, city, and applicable emergency managers/planners, subject matter experts, recruits from other jurisdictions such as other local government units, private sector, non-governmental, academia, airports, military, and the public were also consulted during this planning activity.

The West Valley City Natural Hazards Pre-Disaster Mitigation (PDM) Plan was developed in accordance with the requirements of the FEMA Section 322 regulations, 44 CFR Part 201, the Utah Division of Emergency Management (UDEM) and local planning agencies. Regulations set forth by FEMA were followed during the development of this Plan. Future monitoring, evaluating, updating and implementation will occur annually or following any natural disaster. A major revision will occur every five years. Annual or any interim Plan review, updates and revisions will be the responsibility of each adopting jurisdiction.

Often, hazard mitigation is a neglected aspect within emergency management. When local governments place a low priority on mitigation implementation activities relative to the perceived threat, some important mitigation measures may be neglected in favor of higher priority activities. Mitigation success can be achieved, however, if accurate information is

portrayed through complete hazard identification and impact studies, followed by effective mitigation management. Hazard mitigation is the key to greatly reducing long-term risk to people and property from natural hazards and their effects.

As part of the creation of this document, West Valley City agreed that the deliverables would contain:

- Identification of hazards unique to the jurisdiction and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input, and development of mitigation actions complementary to those goals. A range of actions must be identified specifically for each jurisdiction;
- Demonstration that there has been a proactively offered opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in an any planning process, attendance at meetings, contributing research, data, other information, commenting on drafts of the plan);
- Documentation of an effective process to maintain and implement the plan;
- Formal adoption of the Multi-Jurisdictional Hazard Mitigation Plan by the jurisdictions' governing body (each jurisdiction must officially adopt the plan), within the timelines designated with the State's FEMA approved Mitigation Plan.

1.4 Authority and Reference

Federal

Public Law (PL) 93-288 as amended, established the basis for federal hazard mitigation activity in 1974. A section of this Act requires the identification, evaluation and mitigation of hazards as a prerequisite for state receipt of future disaster assistance outlays. Since 1974, many additional programs, regulations and laws have expanded on the original legislation to establish hazard mitigation as a priority at all levels of government. When PL 93-288 was amended by the Stafford Act, several additional provisions were added that provide for the availability of significant mitigation measures in the aftermath of Presidential declared disasters. Civil Preparedness Guide 1-3, Chapter 6- Hazard Mitigation Assistance Programs, places emphasis on hazard mitigation planning directed toward hazards with high impact and threat potential.

President Clinton signed the Disaster Mitigation Act of 2000 (DMA 2000) into law on October 30, 2000. Section 322 defines mitigation planning requirements for state, local and tribal governments. Under Section 322, States are eligible for an increase in the federal share of hazard

mitigation if they submit a mitigation plan (which is a summary of local and/or regional mitigation plans) that identifies natural hazards, risks, vulnerabilities and actions to mitigate risks.

State

Some examples of legislation enhancing the ability of government and persons to mitigate, respond and recover from natural disasters include the Governor's Emergency Operation Directive, The Robert T. Stafford Disaster Relief and Emergency Assistance Act, amendments to Public Law 93-288, as amended, Title 44, CFR, Federal Emergency Management Agency Regulations, as amended, State Emergency Management Act of 1981, Utah Code 53-2, 63-5, Disaster Response Recovery Act, 63-5A, Executive Order of the Governor 11, and the Emergency Interim Succession Act, 63-5B.

Local

Local governments play an essential role in implementing effective mitigation. For the purposes of this Plan, local governments include not only cities and counties, but also special service districts with elected boards. Each local government will review all present or potential damages, losses and related impacts associated with natural hazards to determine the need or requirement for mitigation action and planning. In West Valley City, the local executives are responsible for carrying out plans and policies, including the council and city or town mayors and administrators. Local governments must be prepared to participate in the post-disaster hazard mitigation team process and pre-mitigation planning as outlined in this document in order to effectively protect their citizens.

2 Community Profile

2.1 State of the City

Existing Land Uses in West Valley City

West Valley City's land use has changed substantially since 1982 when the City's first land use study was performed. As Figure 1.1 and Table 1-1 indicate, the amount of land in agricultural use has declined considerably, as has vacant, unbuilt land. Accounting for this, in large part, is the increase of land developed for residential land uses.

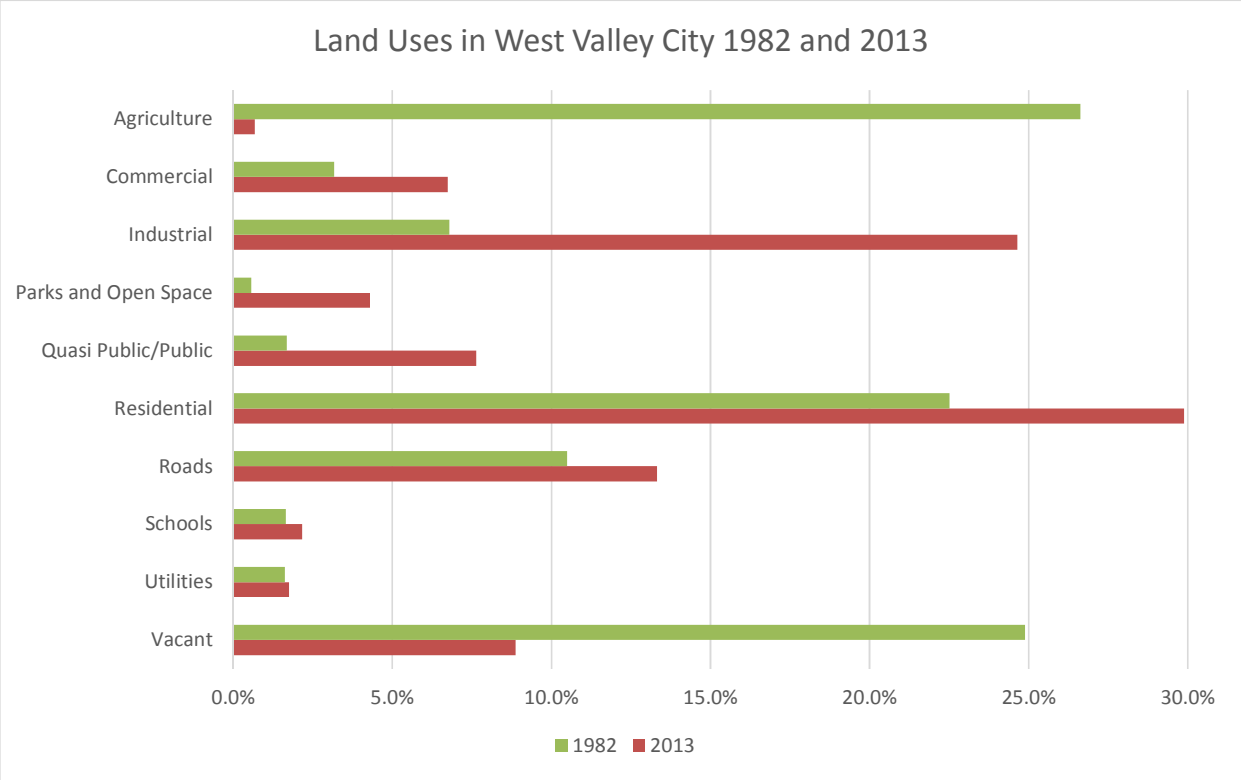


Figure 1.1: Land Use in West Valley City: 1982 and 2013
Source: West Valley City Building Inspection Department.

	1982			2013		
Land Use	Acres	% of City	% of Residential	Acres	% of City	% of Residential
Agriculture	4,605	26.6%		154	0.7%	
Commercial	550	3.2%		1,548	6.8%	
Industrial	1,175	6.8%		5,649	24.6%	
Parks & Open Space	98	0.6%		986	4.3%	
Quasi Public/Public	291	1.7%		1,752	7.6%	
Residential Total	3,892	22.5%		6,855	29.9%	
Single Family	*3,387*	*19.6%*	*87.0%*	*5,774*	*25.2%*	*84.2%*
Duplex	*153*	*0.9%*	*3.9%*	*159*	*0.7%*	*2.3%*
Mobile Home	*211*	*1.2%*	*5.4%*	*327*	*1.4%*	*4.8%*
Multi-Family	*141*	*0.8%*	*3.6%*	*595*	*2.6%*	*8.7%*
Roads	1,815	10.5%		3,055	13.3%	
Schools	285	1.6%		495	2.2%	
Utilities	281	1.6%		402	1.8%	
Vacant/Undeveloped Land	4,303	24.9%		2,033	8.9%	
Totals	**17,294**			**22,930**		

Table 1-1: Land Uses in West Valley City: 1982 and 2013
Source: West Valley City Community & Economic Development

Another noteworthy change shown in Table 1.1 is the 33 percent increase in total City acreage realized through several annexations.

Residential

Since incorporation, the percentage of residential land developed for single family homes has remained fairly constant; single family homes represented 87% of developed residential land in 1982, and that figure has only dropped to 84% by 2013. However, multi-family residential land has increased from 3.6% of all residential land in 1982 to 8.6% in 2013.

Commercial

The percentage of land dedicated to commercial uses has doubled since 1982, and now represents 6.8% of the City. Community shopping centers at 4100 South and 5600 West, 4700 South and 4000 West, and 6200 South and 5600 West provide vital goods and services to the immediate areas. 5600 West north of 3500 South is rapidly developing and has become a regional draw. Commercial properties continue to redevelop along 3500 South and Redwood Road.

Industrial

Industrial land has expanded dramatically from 6.9% in 1982 to 24.6% in 2013. Alliant Techsystems Inc. owns nearly 40 percent of all industrial land in West Valley City. West Ridge, Lake Park

Corporate Center, Lake Pointe Corporate Center, Presidential Business Center, trucking companies along the SR-201 frontage road, and the ARA Industrial Business Park are all major industrial centers.

Parks and Open Space

The allocation of land for parks and recreation increased substantially in the early days of the City, from 98 acres in 1982 to 986 in 2013. This growth was fueled by the development of West Ridge Golf Course, Centennial Park, Stonebridge Golf Course, and several regional and neighborhood parks of varying sizes. Since the last General Plan update, we have lost some acreage due to construction of the Mountain View Corridor and reconfiguration of the West Ridge Golf course.

Agriculture

Agricultural land has given way to development. Over a quarter of the City was in agricultural use in 1982. Through the development of new residential subdivisions, shopping centers and industrial parks, agricultural property now constitutes less than 1% of the City's total area.

Since the last General Plan Update, the City has experienced some significant changes. These changes include major new developments as well as transportation improvements.

Important Development Projects

Since the last General Plan Update, the areas around 5600 West and Fairbourne Station have experienced significant development:

- The Highbury development is well underway. This is a mixed-use project featuring a variety of retail uses along 5600 West, a mix of housing types, schools, and open space with significant water features. Highbury will complement the Lake Park project, a major regional employment center that houses over 13,000 jobs.
- At Fairbourne Station, the Embassy Suites Hotel has been built, the first phase of the Residences at Fairbourne are being completed, and the Plaza and first phase of the Promenade have been built.
- As of 2014, the Valley Fair Mall continues their expansion and renovation plans. Valley Fair Mall has increased their retail square footage from 600,000 to 1,000,000 square feet.
- The City formed the North West Economic Development Area for the ARA Industrial Business Park development, which will bring up to 3.4 million square feet of new warehousing space to the City.

Transportation Improvement Projects

A number of significant transportation and transit projects have also been completed or are underway:

- The reconstruction of 3500 South with dedicated BRT lanes and raised passenger platforms was completed in 2010.
- The West Valley City TRAX Green Line began operating in 2011.
- As of 2014, Phase One of the Mountain View Corridor (two lanes each travel direction with surface intersections) has been built from the south end of the valley to 5400 South. Property acquisition for the entire freeway through West Valley City is well underway.

Housing, Demographics, and Employment

The graphs and table that follow provide a basic picture of the current state of West Valley City with information on employment, housing tenure and household size and other pertinent statistics. The introduction and background sections of each chapter provide more detailed information relevant to the particular chapter. For example, the background section of the Transportation element includes information on traffic volumes on major streets.

As of 2012, West Valley City had an estimated 37,419 housing units with an average household size of 3.49 people. The relatively dramatic increase in the average household size of renter-occupied units has pushed the total average household size up over the past 20 years (2.85 in 1990 to 3.47 in 2012), despite the relatively stable household sizes of owner-occupied units (3.58 in 1990 to 3.51 in 2012). Of all of the states in the nation, Utah has the highest average household size at 3.10 persons per household (the national average is 2.58).

Table 1-2 WVC Housing Tenure & Household Size 2012

	1990	2000	2010	2012
Occupied Housing Units	25,933	32,253	37,139	37,419
Owner-Occupied Housing Units	17,456	23,418	25,975	25,484
Renter-Occupied Housing Units	8,477	8,835	11,164	11,934
Average Household Size of Owner-Occupied Units	3.58	3.48	3.51	3.51
Average Household Size of Renter-Occupied Units	2.85	3.05	3.41	3.47
Total Average Household Size	3.35	3.27	3.48	3.49

Source: U.S. Census Bureau Table DP-1, 2012 ACS DP-04
www.census.gov

Table 1-2: Housing Tenure & Household Size

The residents of West Valley City represent a broad variety of races and ethnic backgrounds, compared to the state as a whole. Approximately half (48.4%) of West Valley City residents identify with a race other than white/Caucasian, while the same is true for only about two in ten (19.9%) Utah residents. Owing mainly to the influence of the Church of Jesus Christ of Latter-Day Saints, West Valley City has the highest share of population who identify as Native Hawaiian or Other Pacific Islander outside of Hawaii and U.S. Territories in the Pacific. West Valley City has 3,909 Native Hawaiian or Other Pacific Islander residents – 3.0 percent of the total population. Similarly, the City has a significant number of residents (34.9 percent) who identify as Hispanic or Latino, a share that has grown tremendously over the past two decades. It is important to note that Hispanics can be of any race. As of 2012, 51.6 percent of West Valley City residents identified as white and non-Hispanic, making West Valley City one of the most diverse cities in a rather homogenous state. As the LDS Church continues to draw people from all over the world to its Utah headquarters and as ethnic and racial minorities continue to establish durable networks and successful communities in West Valley City, this trend toward greater diversity will likely continue.

Table 1-3 Population by Race 2012

	Total Population	White Alone	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone	Two or More Races	Hispanic or Latino
	2,814,910	2,253,438	27,304	28,007	56,384	25,082	3,465	50,837	370,393
Utah	100.00%	80.1%	1.0%	1.0%	2.0%	0.9%	0.1%	1.8%	13.2%
Salt Lake	1,048,261	771,089	15,103	6,945	34,766	15,675	1,927	20,934	181,822
County	100.0%	73.6%	1.4%	70.0%	3.3%	1.5%	0.2%	2.0%	17.3%
West	130,981	67,524	2,971	1,149	6,370	3,909	69	3,265	45,724
Valley City	100.0%	51.6%	2.3%	0.9%	4.9%	3.0%	1.0%	2.5%	34.9%

Source: American Community Survey Table DP-05

Table 1-3: Population by Race and Ethnicity 2012

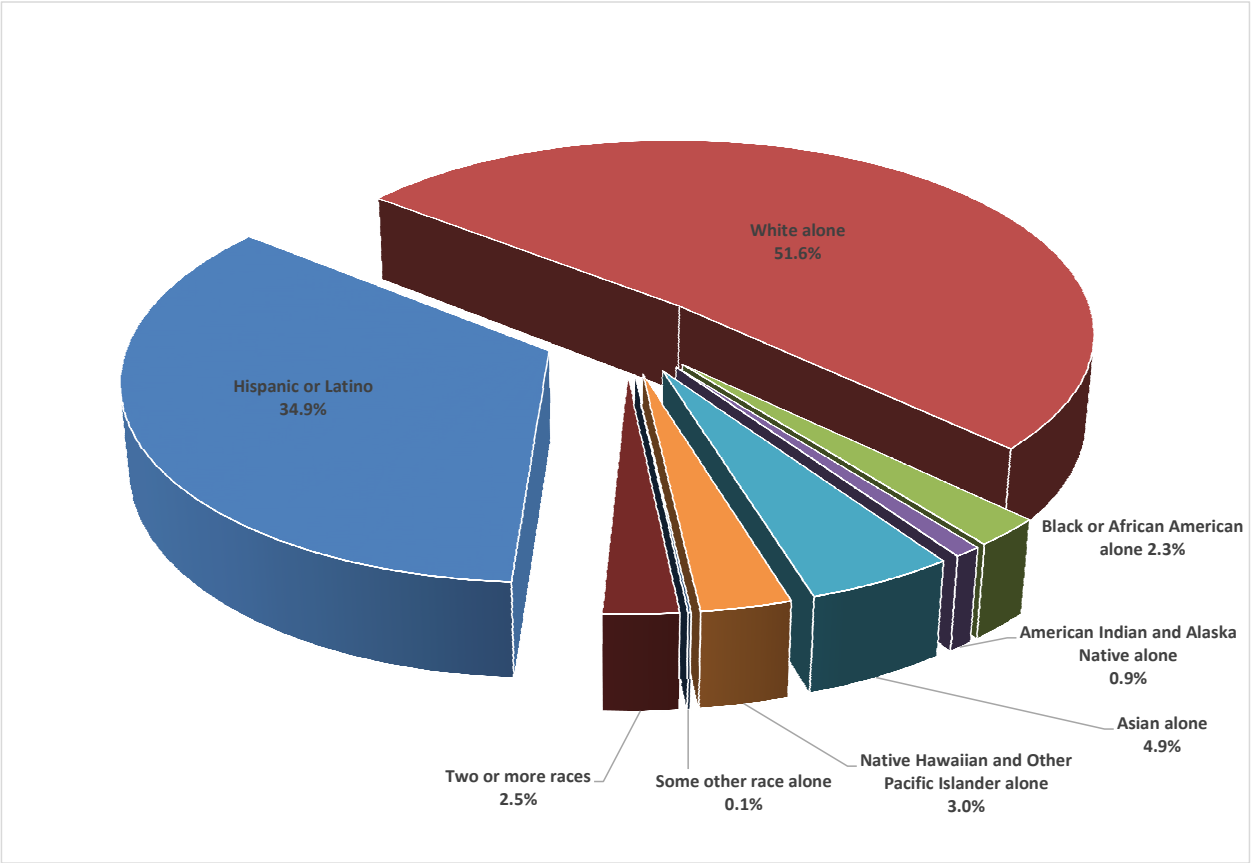


Figure 1-2: Race and Ethnicity in West Valley City in 2012
Source: 2012 ACS DP-05

2.2 Projections

The population of West Valley City, as with the rest of the Wasatch Front, is expected to grow through 2030 and beyond. Internal growth, potential annexation and increases in density in some areas will all impact the overall population of the City. As Salt Lake County expands and fills in, the demand for transportation, transit, retail, and natural resources will also grow regionally. Significant growth is expected in the south valley and the west bench of the Salt Lake valley, which may mean tremendous impacts to West Valley City as a place of residence, as a destination and as a thoroughfare.

West Valley City had a population of 108,896 in 2000 and 129,480 in 2010. West Valley City's population is expected to grow by almost 24% from 2010 to 160,000 by 2040. Salt Lake County's population was 898,387 in 2000 and 1,029,655 in 2010, and in the same period from 2010 to 2040, Salt Lake County's population is expected to grow by an estimated 47% to 1,507,997 in 2040.

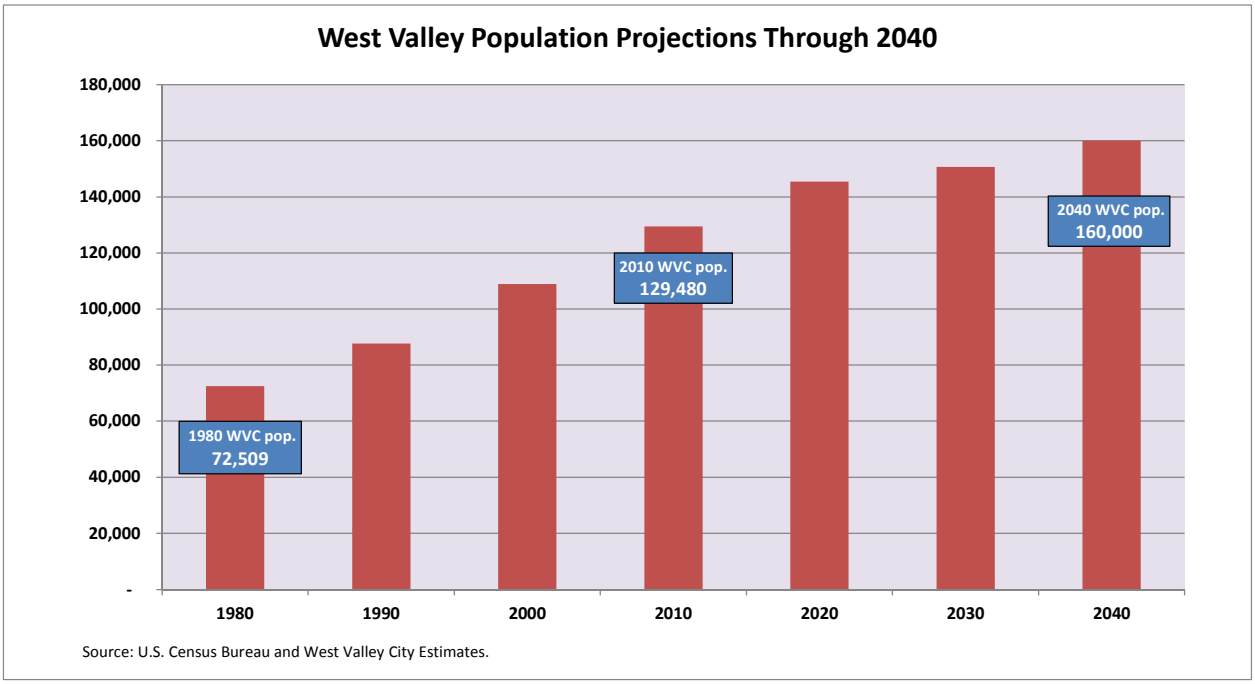


Figure 1-3: Population Estimates and Projections Through 2060

The current and expected future population pyramids show an important countywide transition toward an older population. The median age in Salt Lake County in the year 2000 was just over 27 years of age. In 2010 the median age was 30.8, which is projected to increase to 32 in 2020 and to 33 in 2030. This trend matches that of the State of Utah during the same period. The life expectancy within the State of Utah is expected to increase as well, growing for females from 81.9 years in 2000 to 85.9 years in 2030; and for males, 75.5 years in 2000 to 80.5 years in 2030. The greater life expectancies and transition of the Baby Boomers into retirement age indicate a greater share of older residents in the future. This 'aging' population may have many potential impacts on the county and on West Valley City including increases in needs for senior housing and other services, as well as greater demand for walkability and transit options. In economic development terms, the City could experience more demand for health services, greater retail oriented to older patrons, and demand for recreational services. In regards to housing and transportation, an aging population may demand more walkable neighborhoods, more compact housing without a lot of yard care, and may desire more efficient transit options to fit a fixed income. While we expect to have a greater share of older residents in the future, there will remain a substantial share of young people in West Valley City. This means that while we expand opportunities for older residents we must also pay attention to the sustained demands for support and services aimed at younger populations.

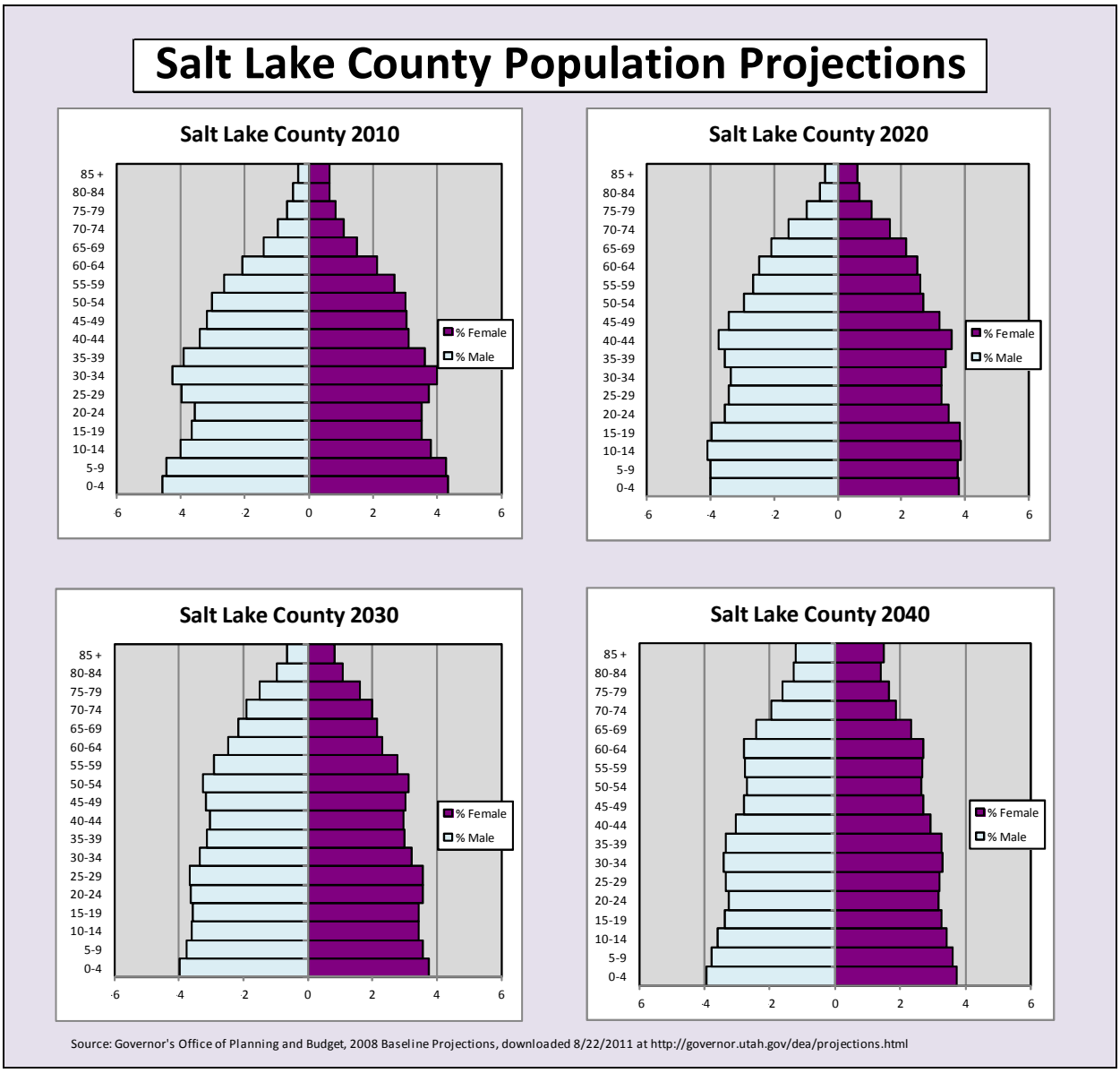


Figure 1-5: Salt Lake County Population Pyramid Projections

In summary, significant growth in population is expected not only in West Valley City, but among all Wasatch Front communities. Rapidly changing demographics and population growth will place different demands on an aging housing stock. As west Valley City is approaching build out in terms of raw land, these changes will raise important questions as to how we grow, what we build, and where we should invest resources and prepare for the future. If the number of people in each household drops, for example, as a result of demographic changes, then more households will be needed to accommodate these residents (beyond that needed to house those added to the overall population), and we must determine the type(s) of housing and living environments that they may desire. From the perspective of this General Plan, this type of housing issue might be addressed

through patterns of growth. Where might we make changes to the City to adapt to a growing and changing population? Considering the growing interest in walkable neighborhoods, increasing costs of fuel, greater demand for transit alternatives, and the general desire for equity within our community, a series of principles have been selected to form the basis for this Vision West 2035 General Plan.

3 Planning Process

This West Valley City Mitigation Plan was prepared by Emergency Management staff members John Evans, and Kari Jaramillo. A core Planning Team with representatives from each city department and Salt Lake County provided information included in this plan. Other local and state agencies that have aided in the process include; city and county geographic information system (GIS) departments, elected officials, local officials, emergency managers, fire and law enforcement departments, planning departments, public works/engineering departments and other local government agencies. The planning process was based on Section 322 requirements of the Disaster Mitigation Act of 2000 (DMA 2000) and supporting guidance documents developed by FEMA and the Utah Division of Emergency Management (UDEM).

Planning Meetings

During the planning process input and guides from all of the city departments were obtained. The following are dates for the process:

Date	Meeting
7/14	Review of the initial process
8/14	Meetings with Salt Lake County on the needs for the plan and involvement
8/14	City planning team meeting for initial input
9/14	Planning meeting with city team and Salt Lake County
9/14	Initial plan sent to all of the team
9/14	Plan on website for public comment
10/14	Draft plan to Salt Lake County

Department Agency Involved

West Valley City Fire	John Evans
West Valley City Emergency Management	John Evans
West Valley City Police Department	Lee Russo
West Valley City Administration	Wayne Pyle
West Valley City Public Works	Russ Willardson
West Valley City Community and Economic Development	Nicole Cottle
West Valley Animal Services	Layne Morris
Salt Lake County Emergency Services	Jeff Gravitz

Public Involvement

Public involvement opportunities were available and incorporated throughout the development of this Plan. Such opportunities included a public website and public meetings for comment review. Emergency managers, fire police, public works, and all departments, state and local agencies, business leaders, educators, non-profit organizations, private organizations, and other interested members that could be affected by a hazard within the region or other interested members, were all a part of the planning process.

The current plan will be placed on the West Valley City Website for the input from the public and comments about the plan.

Information Sources and Revision Process

Sources for Background Information

- Federal Emergency Management Agency (How-to Guides)
- National Weather Service (hazard profile)
- National Climate Data Center (drought, severe weather)
- Utah Division of Emergency Management (Salt Lake City Mitigation Plan, GIS data, flood data, HAZUS data for flood and earthquake)
- Utah Geologic Survey (GIS data, geologic information, various hazard reports)
- Utah Division of Forestry Fire and State Lands (fire data)
- Utah Avalanche Center, Snow and Avalanches, Annual Report 2006-2007 Forest Service
- Utah Department of Transportation (traffic data, avalanche?)
- Utah Automated Geographic Resource Center (GIS data)
- University of Utah Seismic Station (earthquake data)
- Utah State University (climate data)
- Councils or Government
- Association of Governments
- Utah Association of Special Districts
- State Office of Education
- Salt Lake County and municipalities (Emergency Operations Plans, histories, mitigation actions, public input, data: GIS, assessor, transportation, property and infrastructure)
- Earthquake Safety in Utah
- Utah Natural Hazard Handbook 2008
- Utah Statewide Fire Risk Assessment Project

- A Strategic Plan for Earthquake Safety in Utah
- State of Utah Wildfire Plan 2007
- State of Utah Drought Plan 2007
- West Wide Wildfire Assessment 2013

4 Risk Assessment

As defined by FEMA, risk is a combination of hazard, vulnerability, and exposure. "It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage."

The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The process allows for a better understanding of a jurisdiction's potential risk to hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

This risk assessment followed the methodology described in the FEMA publication *Understanding Your Risks—Identifying Hazards and Estimating Losses* (FEMA 386-2, 2002), which breaks the assessment into a four-step process:

1. Identify hazards
2. Profile hazard events
3. Inventory assets
4. Estimate losses

Data collected through this process has been incorporated into the following sections of this chapter:

- **Section 4.1 Hazard Identification:** Natural Hazards identifies the natural hazards that threaten the planning area and describes why some hazards have been omitted from further consideration.
- **Section 4.2 Hazard Profiles** discusses the threat to the planning area and describes previous occurrences of hazard events and the likelihood of future occurrences.
- **Section 4.3 Vulnerability Assessment** assesses the City's total exposure to natural hazards, considering assets at risk, critical facilities, and future development trends.
- **Section 4.4 Capability Assessment** inventories existing mitigation activities and policies, regulations, and plans that pertain to mitigation and can affect net vulnerability.

Note: Neither the examination of human-caused hazards nor the capability assessment are required by FEMA.

This risk assessment covers the entire geographical extent of West Valley City. Since this plan is a multi-jurisdictional plan, the HMPC was required to evaluate how the hazards and risks vary from jurisdiction to jurisdiction. While these differences are noted in this chapter, they are expanded upon in the annexes of the participating jurisdictions. If no additional data is provided in an annex,

it should be assumed that the risk and potential impacts to the affected jurisdiction are similar to those described here for the entire Fresno County planning area.

Each of the hazards that can affect West Valley City, and the potential impacts, will be described in this section, known as a Hazard Identification and Risk Assessment or HIRA.

4.1 Hazard Identification: Natural Hazards

The West Valley Emergency Management HMPC conducted a hazard identification study to determine the hazards that threaten the planning area.

4.1.1 Methodology and Results

Using existing natural hazards data and input gained through planning meetings, the HMPC agreed upon a list of natural hazards that could affect West Valley City. Hazards data from the Utah State Department of Emergency Management and Mitigation, FEMA, the National Oceanic and Atmospheric Administration, and many other sources were examined to assess the significance of these hazards to the planning area. Significance was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries and property and economic damage. The natural hazards evaluated as part of this plan include those that occurred in the past or have the potential to cause significant human and/or monetary losses in the future. Only the more significant (or priority) hazards have a more detailed hazard profile and are analyzed further in Section 4.3 Vulnerability Assessment.

The natural hazards identified and investigated for the West Valley City Multi-Hazard Mitigation Plan include:

- Earthquake
- Flood
- Wildland Fire
- Slope Failure
- Severe Weather
- Dam Failure
- Avalanche
- Pandemic
- Drought
- Infestation
- Radon
- Problem Soils

The HMPC eliminated the natural hazards listed below from further consideration in this risk assessment because they occur rarely or not at all in West Valley City.

- Hurricane

4.2 Hazard Profiles

The hazards identified in Section 4.1 Hazard Identification: Natural Hazards are profiled individually in this section. In general, information provided by planning team members is integrated into this section with information from other data sources, such as those mentioned in Section 4.1. These profiles set the stage for Section 4.3 Vulnerability Assessment, where the vulnerability is quantified, where possible, for each of the priority hazards.

The following sections provide profiles of the natural hazards that the HMPC identified in Section 4.1 Identifying Hazards

The HIRA was initiated through a series of meetings with the Core Planning Team and subject matter experts from the following organizations:

City and county agencies
Utah Geological Survey
National Weather Service
Utah Division of Water Rights
Utah Forestry, Fire, and State Lands
West Valley City Fire Department
Salt Lake Valley Health Department

Each hazard is profiled in the following format:

- **Hazard/Problem Description**—This section gives a description of the hazard and associated issues followed by details on the hazard specific to the Fresno County planning area. Where known, this includes information on the hazard extent, seasonal patterns, speed of onset/duration, and magnitude and/or secondary effects.
- **Past Occurrences**—This section contains information on historical incidents, including impacts where known. The extent or location of the hazard within or near the Fresno County planning area is also included here. Historical incident worksheets were used to capture information from participating jurisdictions on past occurrences.

- **Frequency/Likelihood of Future Occurrence**—The frequency of past events is used in this section to gauge the likelihood of future occurrences. Where possible, frequency was calculated based on existing data. It was determined by dividing the number of events observed by the number of years on record and multiplying by 100. This gives the percent chance of an event happening in any given year (e.g., three droughts over a 30-year period equates to a 10 percent chance of a drought in any given year). The likelihood of future occurrences is categorized into one of the following classifications:
  - **Highly Likely**—Near 100 percent chance of occurrence in next year or happens every year.
  - **Likely**—Between 10 and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less.
  - **Occasional**—Between 1 and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.
  - **Unlikely**—Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

Hazard Matrix M-1 provides an initial assessment of the profiles and assigns a level of significance to each hazard. Those hazards determined to be of high significance were characterized as priority hazards that required further evaluation in Section 4.3 Vulnerability Assessment. Those hazards that occur infrequently or have little or no impact on the planning area were determined to be of low significance. Significance was determined based on the hazard profile, focusing on key criteria such as frequency and resulting damage, including deaths/injuries and property, crop, and economic damage. This assessment was used by the HMPC to prioritize those hazards of greatest significance to the planning area; thus enabling the County to focus resources where they are most needed.

The hazards in Table 4 were identified by the Planning Team as having the potential to affecting all or a portion of West Valley City, based on history of occurrences and/or future probability. Each of these were carried over from the 2009 WFRC Pre-Disaster Mitigation Plan, with the addition of Avalanche and Flu Epidemic.

The HIRA process was aided through the use of FEMA How-to Guidance Documents, FEMA Local Mitigation Planning Handbook, Local Mitigation Plan Review Guide, the Utah State Hazard Mitigation Plan, Utah Natural Hazards Handbook 2008, FEMA 386-1,2,3,7, Disaster Mitigation Act of 2000, 44 CFR Parts 201 and 206, Interim Final Rule, and FEMA Region VIII Crosswalk. The risk assessment process also utilized assistance from local GIS departments using the best available data.

Hazard	How Identified	Why Identified

Earthquake	Review of City Emergency Operations Plans Review of past disaster declarations Input from City and County Emergency Operations Managers, USGS, UGS, Utah DEM, and community members	Utah has a 1/5 chance, of experiencing a large earthquake within the next fifty years. Numerous faults throughout Utah including the Intermountain Seismic Zone. Yearly, Utah averages approximately 13 earthquakes having a magnitude 3.0 or greater. Earthquakes can create fire, flooding, hazardous materials incident, transportation, and communication limitations. The Wasatch Front has recorded large earthquakes in the past and can be expected to experience large earthquakes in the future.
Flood	Review of past disaster declarations Input from City and County Emergency Operations Managers, Utah DWS, UGS, Utah Army Corps of Engineers, Utah DEM, and community members Review of Flood Insurance Studies, Floodplain maps, and FIRMs	Several incidents have caused severe damage and loss of life. Many of the rivers and streams are located near neighborhoods. Many neighborhoods are located on floodplains, alluvial fans. Topography and climate lead to cloudburst storms and heavy precipitation can result in flash flooding throughout most of the Wasatch Front.
Wildland Fire	Review of City Emergency Operations Plans Review of Community Wildfire Plans Input from County Emergency Managers, Utah DEM, Utah FFSL, Utah FS, NWS, FEMA, and local community members	Serious threat to life and property. Much of county is at risk Increasing threat due to urban growth in WUI areas. Secondary threat associated with flooding, drought, and earthquake. Additional funding and resources offered by local and state agencies to reduce risk. To increase community awareness.
Slope Failure	Input from City and County Emergency Operations Managers, USGS, UGS, NCDC, Utah DEM, and community members	Have caused damage in the past to residential and commercial infrastructure. Can be life threatening. Generally occur in known historic locations therefore risks exist through- out much of the Wasatch Front. To increase community awareness.
Severe Weather	Review of City Emergency Operations Plans Review of past disaster declarations Input from City and County Emergency Operations Managers, Utah Avalanche, Forecast Center, Utah Department of Transportation, and community members	Damage to communities, homes, infrastructure, roads, ski areas, and people. Can cause property damage and loss of life. Results in economic loss. Lightning is number one cause of natural hazard death in Utah. Can be costly to recover from. Affects the young and old more severely.
Dam Failure	Review of City Emergency Operations Plans Input from community members, Utah DWS, Dam Safety Section, Utah DEM Review of inundation maps	Can cause serious damage to life and property and have subsequent effects such as flooding, fire, debris flow, etc.. Many reservoirs located in the county. Threat to downhill communities. Subsequent effects include flooding, fire, and debris flows. To increase community awareness. To incorporate mitigation measures into existing plans to help serve local residents.
Avalanche	Input from community members, previously considered as part of severe weather, now addressed as separate hazard	Canyon residents and tourist populations can become isolated Transportation routes to canyons can be obstructed.

Flu Epidemic	Salt Lake Valley Health Department Input from City and County Emergency Managers Review of County Emergency Operations Plan	Can affect large number of population Disrupt services and result in economic loss Can overwhelm health care providers
Drought	Review of Utah State Water Plan Input from community members, Utah DHLS, NWS, NCC, and NCDC	Affects local economy and residents. Reduces available water in reservoirs impacting culinary, irrigation, and municipal water supplies. Drought periods may extend several years. Secondary threat associated with wildfire. Utah is the nation's second driest state. Can impact farming and ranching operations. Neighboring communities have been affected by culinary and irrigation water shortages
Infestation	Review of Utah Department of Agriculture and Food Annual Insect Report and the Utah Forest Insect and Disease Report Input from community members, UDAF, Utah FFSL, and the Utah State University Extension Service	Consistently affects this region. Declined forest health and agriculture losses. Previous experiences have affected the residents of the Wasatch Front. Results in economic loss. Destruction can be severe and is very costly to mitigate. To better understand mitigation and response techniques.
Radon	UGS Maps Utah Division of Radiation Control Testing Data.	Is odorless and colorless. Can cause lung cancer over time.
Problem Soils	• Review of City Emergency Operations Plans • Input from community members, Utah, DEM, and UGS • Researched historical data	• Related to subsequent effects from earthquakes. • Have affected infrastructure and local economy in the past.

	Avalanche	Dam Failure	Drought	Earthquake	Flood	Infestation	Landslide	Pandemic	Problem Soil	Radon	Severe Weather	Wildfire
West Valley	Low	Low	Low	High	Mod	Low	Low	Mod	Low	Low	High	Low

Hazard Matrix M-1

4.2.1 Earthquake

The Utah Geologic Survey defines an earthquake as the "abrupt, rapid shaking of the Earth caused by sudden breakage of rocks that can no longer withstand the stresses that build up deep beneath the earth's surface". The rocks break along zones of weakness, called faults. Seismic waves are then transmitted outward and also produce ground shaking or vibrations in the earth. (Utah Natural Hazards Handbook. 2008).

The Richter scale measures the magnitude of earthquakes on a seismograph. Generally an earthquake needs to be at least a magnitude 2.0 to be felt by humans, and about magnitude 5.5 before significant damage occurs. The amount of damage that occurs from an earthquake depends on soil type, rock type, ground-water depth and topography. Other factors include the type of construction in an area and the population density.

Secondary Hazards: Associated earthquake hazards include ground shaking, surface fault rupture and tectonic subsidence, soil liquefaction, flooding, avalanches, dam failure, fire, and slope failure.

Ground Shaking: Ground shaking is caused by the passage of seismic waves generated by an earthquake. Shaking can vary in intensity but is the greatest secondary hazard because it affects large areas and stimulates many of the other hazards associated with earthquakes. Moderate to large earthquake events generally produce trembling for about 10 to 30 seconds. Aftershocks can occur erratically for weeks or even months after the main earthquake event.

The waves move the earth's surface laterally and vertically and vary in frequency and amplitude. High frequency, small amplitude waves cause more damage to short, stiff buildings. Low frequency, large amplitude waves have a greater effect on high-rise buildings. The intensity depends on geologic features such as bedrock and rock type, topography, and the location and magnitude of the earthquake. Other significant factors include ground water depth, basin shape, thickness of sediment, and the degree of sediment consolidation. (UNHH 2008)

Surface Fault Rupture and Tectonic Subsidence: Surface fault rupture is the result from relative movement between blocks in the Earth's crust. In Utah, the result is the formation of scarps or steep breaks in the slope. The 1934 Hansel Valley earthquake resulted in a surface displacement of approximately 1.6 feet. Earthquakes having a magnitude of 6.5 or greater could result in surface faulting 16 to 20 feet high and 12 to 44 mile long break segments. Surface displacement generally occurs over a zone of hundreds of feet wide called the zone of deformation and can cause severe damage to building foundations or lifelines (roads, pipelines, communication lines) that cross the fault. Tectonic subsidence, or down dropping and tilting of the valley floor, generally depends on the amount of surface fault rupture, and can cause flooding by tilting lakebeds or dropping ground surface below the water table. The greatest amount of subsidence will be in the fault zone and will gradually diminish out into the valley (UDCEM 1991).

Soil Liquefaction: Liquefaction can occur when water-saturated, cohesionless, sandy soils are subjected to ground shaking. The soils "liquefy" or become like quicksand, lose bearing capacity and shear strength, and readily flow on the gentlest of slopes. Liquefaction is common in areas of shallow ground water and sandy or silty sediments. Liquefaction can produce lateral spreading and flows, where surface soil layers break up and move independently. Displacement of up to 3

feet may occur, accompanied by ground cracking and differential vertical displacement. Soil may move downhill, pulling apart roads, buildings, pipelines and buried utilities. Bearing capacity will lessen and can cause buildings to settle or tip, while lightweight buoyant structures such as empty storage tanks may "float" upward. Liquefaction can also cause foundation materials beneath earthfill dams to liquefy and fail, flooding by ground water in low-lying areas, back up of gravity fed systems, and/or cause sand boils. Sand boils are deposits of sandy sediment ejected to the surface during an earthquake along fissures. Liquefaction can occur during earthquakes of magnitude 5.0 or greater. (UNHH 2008)

Slope Failure: Ground shaking can cause rock falls and landslides in mountainous or canyon areas. Rock falls are the most common slope failure and can occur up to 50 miles away from a 6.0 magnitude earthquake. Landslides occur along steep slopes and benches in wet, unconsolidated materials. During a 6.0 magnitude earthquake, landslides typically occur within 25 miles of the source. (UNHH 2008)

Flooding: "Flooding can happen due to tectonic subsidence and tilting, dam failure, seiches (waves generated in standing bodies of water) in lakes and reservoirs, surface-water diversion or disruption, and increased ground-water discharge." (UNHH 2008)

Avalanches: Avalanches could be triggered because of the associated ground movement. The most vulnerable areas include those that have steep terrain, high precipitation, high earthquake potential, and high population density, and heavy backcountry use (UNHH 2008).

Sensitive Clays: Sensitive clays are a soil type that loose strength and are subject to collapse when shaken. The resulting type of ground failure is similar to liquefaction (UNHH 2008).

Subsidence: A settling or sinking of loose granular materials such as sand and gravel that do not contain clay. Western Utah is subject to this type of ground settlement (UNHH 2008).

Earthquake Hazard Profile

Potential Magnitude	***X***	**Catastrophic (>50%)**	**Probability**		**Highly Likely**
		Critical (25-50%)		**X**	**Likely**
		Limited (10-25%)			**Possible**
		Negligible (< 10%)			**Unlikely**
Location	Ground shaking will be felt throughout the entire city. Surface fault rupture can be found in areas of known historic fault movements. Liquefaction can be expected in areas of high to moderate liquefaction potential.				

Seasonal Pattern	None.
Conditions	Liquefaction potential within areas with shallow ground water. Soil that is comprised of old lakebed sediments. Historic movement along faults. Intermountain Seismic Zone, Wasatch Fault.
Duration	Actual ground shaking will be under one minute, aftershocks can occur for weeks or even months.
Secondary Hazards	Fire, landslide, rock falls, avalanche, flooding, hazardous material release, transportation and infrastructure disruptions, essential service disruptions (communications, utilities).
Analysis Used	Review of hazard analysis plans and other information provided by the University of Utah Seismograph Station, UGS, USGS, FEMA, UDEM, AGRC.

Table 5

Location and Extent:

Utah's earthquake hazard is greatest within the Intermountain Seismic Belt (ISB), which extends 800 miles from Montana to Nevada and Arizona, and trends from north to south through the center of Utah (The Wasatch Fault, UGS PIS 40). The ISB contains the Wasatch fault; one of the longest and most active normal faults in the world, with a potential for earthquake with a magnitude up to 7.5. The largest earthquakes in Utah occur in the ISB, where at least 35 earthquakes of magnitude 5.0 or greater have occurred since 1850. (UNHH 2008)

The Wasatch Fault traces along the base of the Wasatch mountain range. It is made up of 10 segments that act independently, meaning that a part of the fault ruptures separately as a unit during an earthquake. The Salt Lake City Segment traverses Salt Lake County from north to south, roughly along the eastern foothills of the Wasatch Mountains. Within the Salt Lake City segment of the Wasatch Fault are three smaller segments from north to south known as Warm Springs Fault, Virginia Street Fault and the East Bench Fault.

Other faults within West Valley City include the West Valley Fault Zone and the East Great Salt Lake Fault Zone. Each of these fault zones has much longer return interval (2,500 years or more) and is not expected to produce a major quake in the near future.

Name	Fault Type	Length (km)	Time of Most Recent Deformation	Recurrence Interval
West Valley fault zone, Granger segment	Normal	16	1,500±200 cal yr B.P.	2,600-6,500 years
West Valley fault zone, Taylorsville segment	Normal	15	2,200±200 cal yr B.P.	6,000-12,000 years

Table 6. Quaternary Faults, Salt Lake County (UGS 2002, UGS 2006) cal yr B.P.=calendar years before present

History:

Although no surface-faulting earthquakes have occurred on the Wasatch fault since settlement in Utah, evidence of numerous prehistoric events exists in the geologic record (The Wasatch Fault, UGS PIS 40) The segments between Brigham City and Nephi have a composite recurrence interval (average time between earthquake events) for large surface-faulting earthquakes (magnitude 7.0-7.5) of 300-400 years. The average repeat time on an individual segment is 1,200-2,600 years. The most recent surface-faulting earthquakes occurred about 500 years ago on the Provo and Weber segments, and about 350 years ago on the Nephi segment. (UNHH 2008)

Utah experiences approximately 700 earthquakes each year, and approximately six of those have a magnitude 3.0 or greater. On average, a moderate, potentially damaging earthquake (magnitude 5.5 to 6.5) occurs every 10 years. Large earthquakes (magnitude 6.5-7.5) occur on average every 50 years (UNHH 2008). The history of seismic activity in Utah and along the Wasatch Front suggests that it is not a matter of "if" but when an earthquake will occur. The probability of a large earthquake occurring along the central segments of the Wasatch Front is 13 percent in 50 years, or 25 percent in 100 years. (The Wasatch Fault, UGS PIS 40)

The two largest measured earthquakes to occur in Utah were the Richfield earthquake of 1901, with a magnitude of 6.5 and the Hansel Valley earthquake of 1934 with a magnitude of 6.6.

"*The Hansel Valley earthquake produced MM intensities of VIII in Salt Lake City, with numerous reports of broken windows, toppled chimneys, and structures twisted on their foundations. A clock mechanism weighing more than 2 tons fell from the main tower of the Salt Lake City County Building and crashed through the building. The only death that occurred during the event was caused when the walls of an excavation collapsed on a public-works employee south of downtown Salt Lake City*." (Lund 2005)

Utah's most damaging earthquake was of a smaller magnitude (5.7), which occurred near Richmond in Cache Valley in 1962. This earthquake damaged over 75 percent of the houses in Richmond, as well as roads and various other structures. The total damage was about $1 million (in 1962 dollars). (UNHH 2008).

Significant earthquakes have occurred in Salt Lake County within the last 50 years. In 1962, a 5.2 Richter magnitude quake jolted the West Valley/Magna area. In 1992, a magnitude 4.2 quake shook the southern portion of the County.

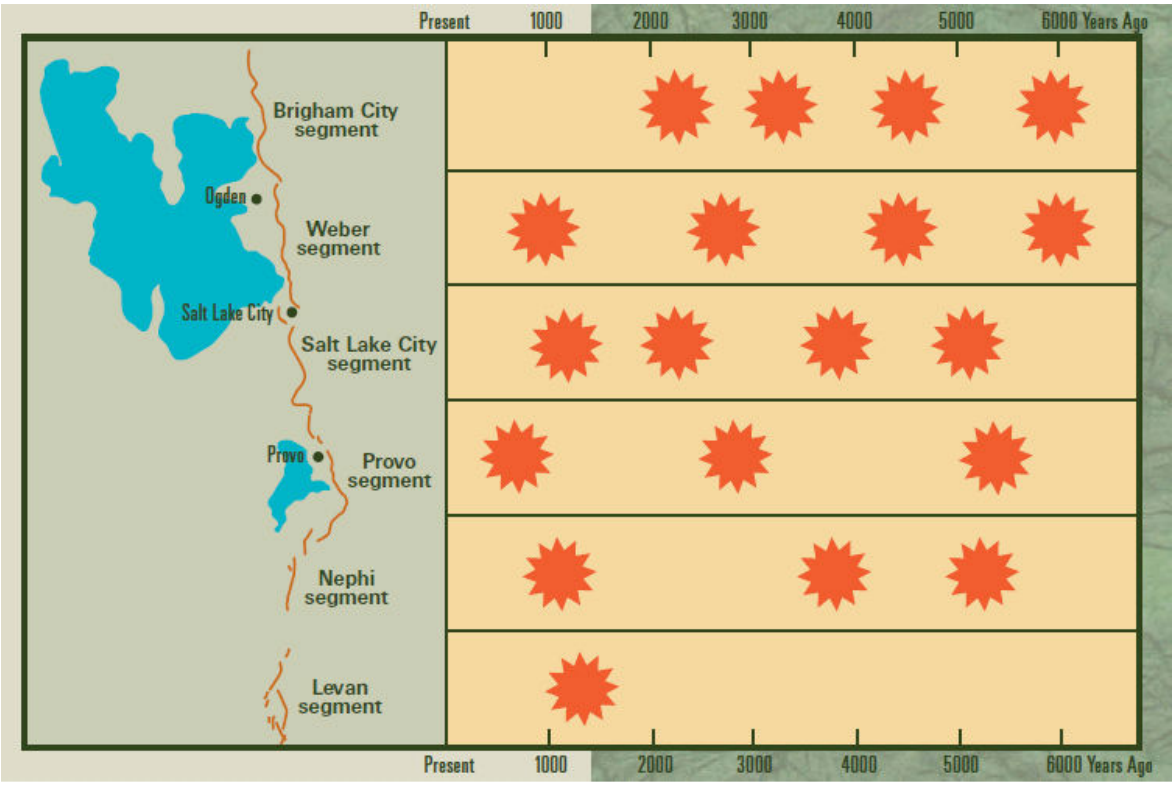


Table 7. Wasatch Fault Segments and Timeline of Major Ruptures ("The Wasatch Fault", Utah Geological Survey Public Information Series 40)

Liquefaction is one of the secondary hazards associated with an earthquake and affects nearly all of Salt County. The County is located atop the ancient Lake Bonneville lakebed, which is made up of unconsolidated sandy soils. Much of the valley is also subject to shallow ground water and a relatively high earthquake threat. These three factors are prevalent in the northern quarter of the County.

Vulnerability Assessment

Vulnerability of people and infrastructure to earthquake hazards in West Valley City was obtained from the modeling program HAZUS-MH, completed by FEMA Region VIII.

Jurisdiction	*Total Building Economic Loss*	*Loss Ratio*	*Total Debris (tons)*
West Valley City	$ 1,890,864,776	15%	1,280,884

Table 8.

Jurisdiction	*Displaced Households*	*Individuals Seeking Public Shelter*	*Total Casualties*	*Life-Threatening Injuries and Fatalities*	*URM Count*
West Valley City	5,830	4,944	1,686	169	7,143

Table 9.

Jurisdiction	*Life-Threatening Ratio to Total Pop*	*URM Ratio to Total Structures*
West Valley City	0.130%	23%

Table 10.

2009 Vulnerability Assessment

The following values are from the HAZUS analysis performed by WFRC for the 2009 Regional Mitigation Plan. Because no significant changes in the level of risk or the condition of infrastructure, these values are still considered valid estimates of potential impacts to earthquake in Salt Lake County and West Valley areas. They are based on a probabilistic 2500-year event with a Richter magnitude of 7.1 as well as an arbitrary 5.9 event located in close proximity to West Valley's most populated areas. These locations and magnitudes were chosen for their likelihood and proximity respectively. Default HAZUS-MH inventory for all infrastructure was used. (**For a more detailed explanation of the loss estimation methodology of HAZUS-MH MR2, please see Part VI or the HAZUS-MH Technical Manual (Earthquake Model) at www.fema.gov/hazus).

Building Damage

HAZUS-MH classifies building damage into five states: none, slight, moderate, extensive and complete. Table 11 lists the number of buildings by occupancy estimated to sustain moderate to complete levels of damage during an arbitrarily-determined Richter magnitude 5.9 (M5.9) earthquake scenarios or a probabilistic Richter magnitude 7.1 (M7.1) earthquake scenario. Also listed are the estimated monetary losses to structures, contents/inventory, and income.

Category	**Number of Structures with > 50% Damage**		**Category**	**Estimated Losses**	
	Salt Lake M5.9	**2500-yr M7.1**		**Salt Lake M5.9**	**2500-yr M7.1**
Residential	30,342	157,705	Structural Losses	$519,320,000	$3,419,030,470
Commercial	1,896	5,199	Non-Structural Losses	$1,818,647,000	$12,331,504,070

Industrial	495	1,367	Content Losses	$719,709,000	$4,114,455,740
Government	167	475	Inventory Losses	$29,216,000	$175,756,410
Education	51	159	Income and Relocation Losses	$623,140,000	$3,263,449,580
Totals	32,951	164,905	Totals	**$3,710,032,000**	**$23,304,196,270**

Table 11. Building Damage Counts and Estimated Losses using HAZUS MH

Debris Removal

Table 13 shows how much debris would be generated by the earthquake and how many loads it would take to remove the debris, based on 25 tons per load. One truck can likely haul one load per hour. A second debris removal issue is landfill space. Fifty thousand tons at a weight-to-volume ratio of one ton per cubic yard would cover more than ten acres to a depth of three feet.

Category	Salt Lake M5.9	2500-yr M7.1
Brick, Wood & Others	581,000 tons / 23,240 loads	3,356,000 tons / 134,240 loads
Concrete & Steel	1,195,000 tons / 47,800 loads	7,678,000 tons / 307,120 loads

Table 13. Debris Generated/Number of Loads

Fires Following an Earthquake

Multiple ignitions and broken water mains following an earthquake can make firefighting nearly impossible. HAZUS-MH uses estimated building damages, loss of transportation infrastructure and estimated winds to calculate the estimated area that would be burned following an earthquake.

Casualties

Table 15 estimates casualties likely to occur during each earthquake scenario. The nighttime scenario (2 a.m. local time) assumes a primarily residential concentration of persons, the daytime scenario (2 p.m. local time) a commercial concentration, and the commute scenario (5 pm. local time) a concentration of persons on commuting routes. Categories of casualties include those not requiring hospitalization (minor), those requiring treatment at a medical facility (major), and fatalities.

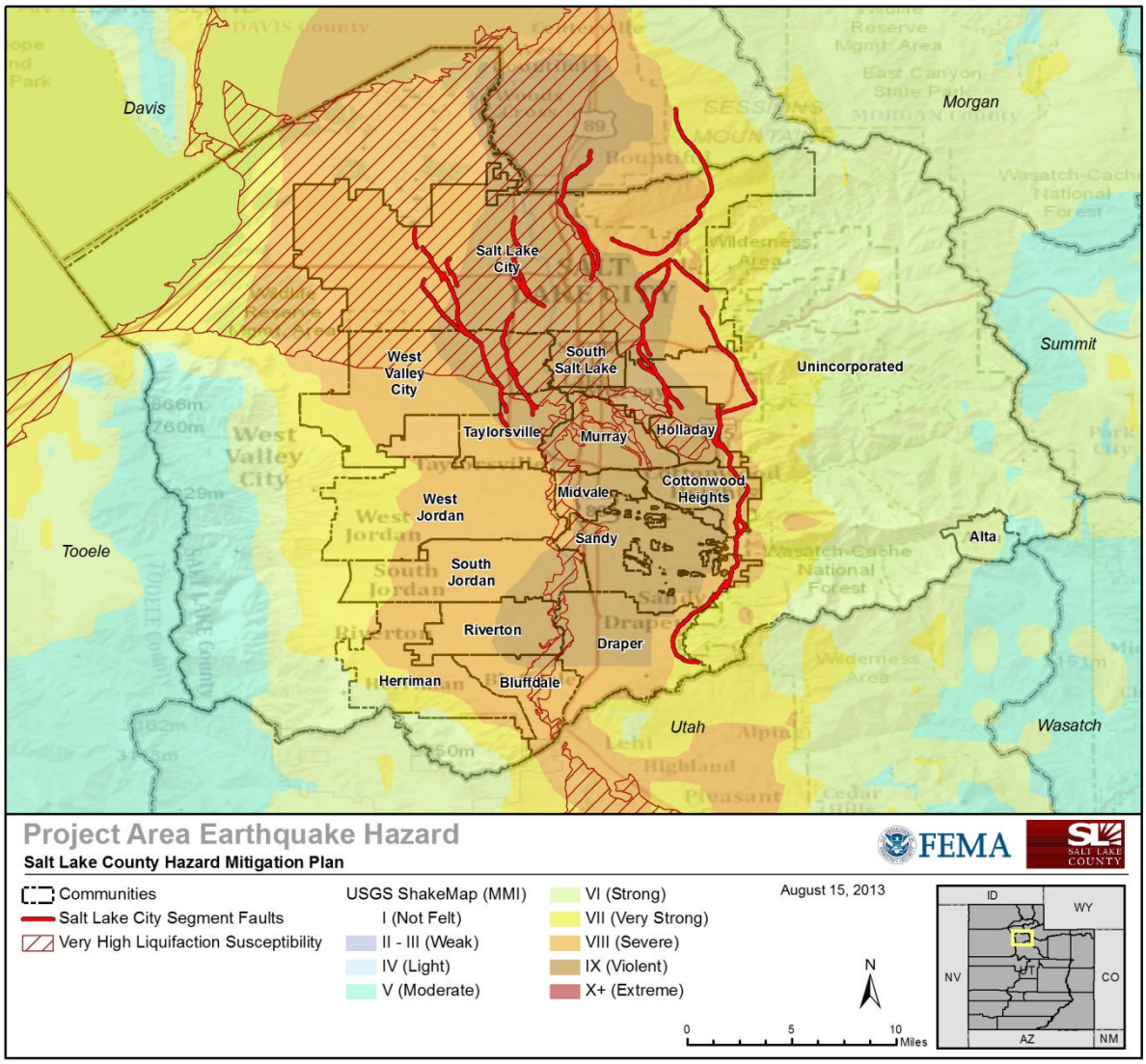
Night Event	Salt Lake M5.9	2500-yr M7.1	Day Event	Salt Lake M5.9	2500-yr M7.1	Commute Event	Salt Lake M5.9	2500-yr M7.1
Minor	1,024	10,475	**Minor**	1,883	17,110	**Minor**	1,432	13,442

Major	219	3,224	**Major**	502	6,192	**Major**	369	4,688
Fatalities	44	758	**Fatalities**	122	1,742	**Fatalities**	87	1,258

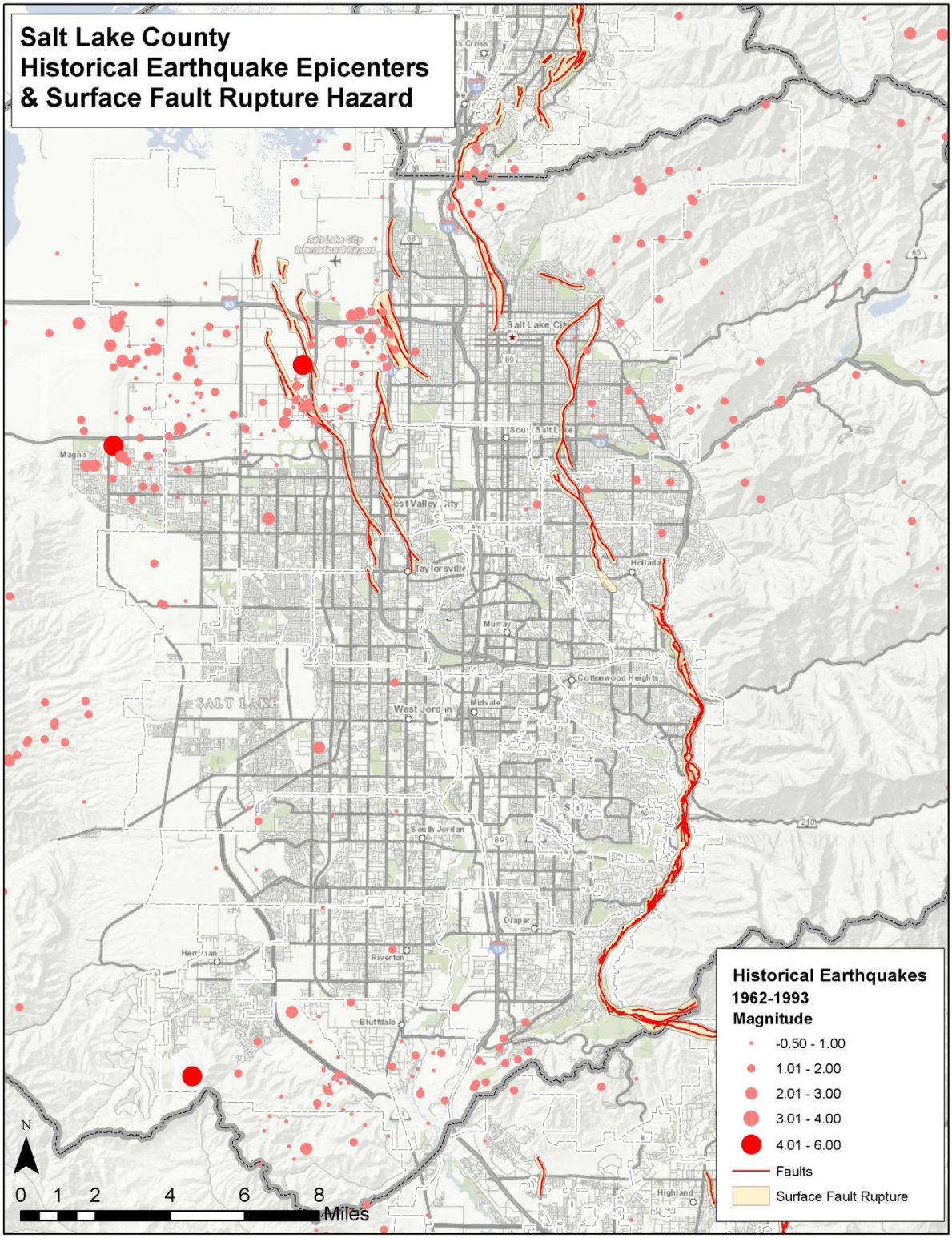
Table 15. Casualties

Community Assets

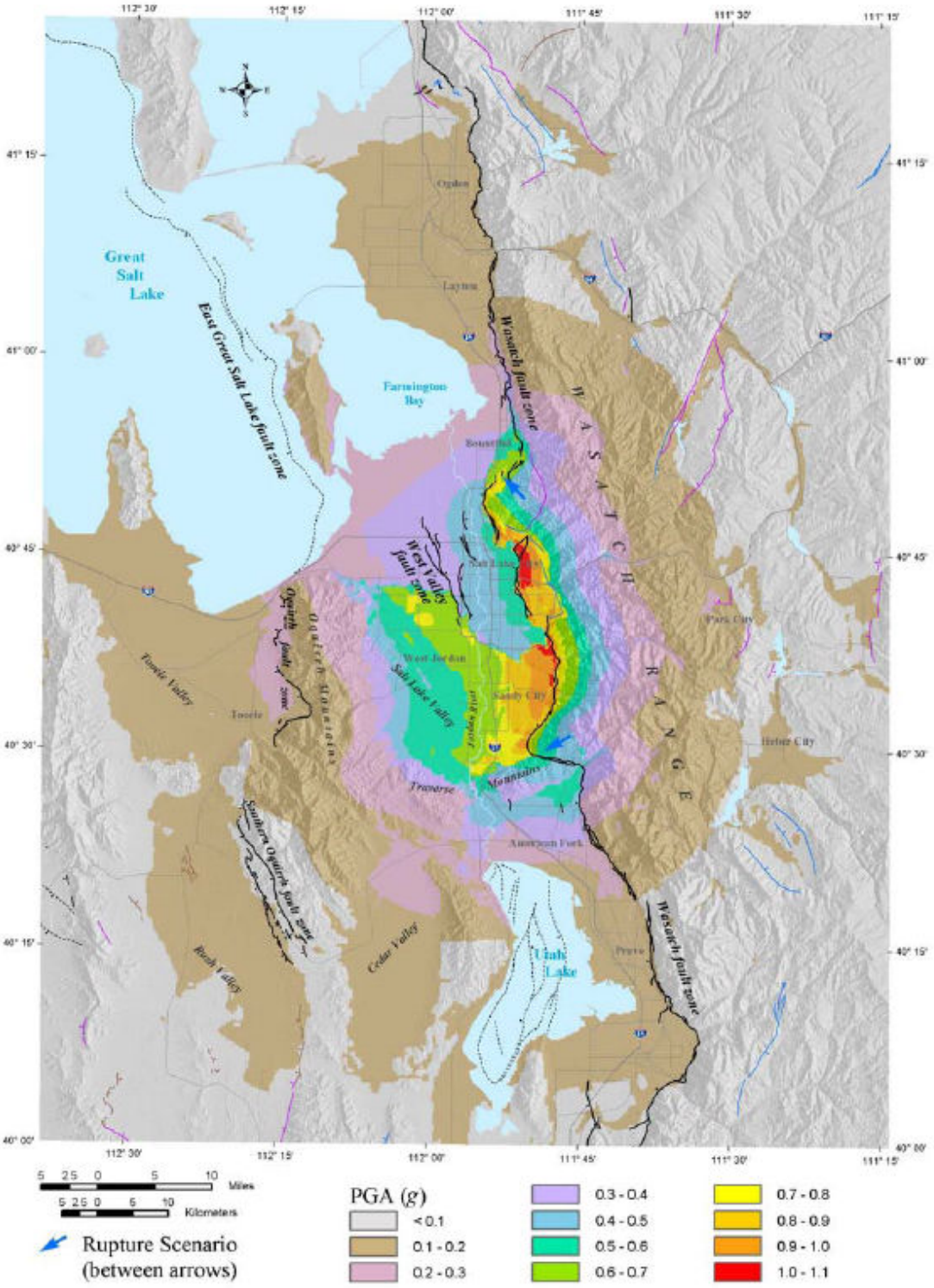
Additional significant community assets with potential impacts by earthquake hazards were identified by the Planning Team. These include areas of particular concern, critical facilities and infrastructure, areas of future development, major employers or economic sectors, cultural or historic facilities, significant populations, or significant natural resources.


Davis
Morgan
Salt Lake City
West Valley City
South Salt Lake
Unincorporated
Summit
Taylorsville
Murray
Holladay
Cottonwood Heights
Midvale
West Jordan
Sandy
Alta
Tooele
South Jordan
Riverton
Draper
Herriman
Bluffdale
Utah
Wasatch
Project Area Earthquake Hazard
Salt Lake County Hazard Mitigation Plan
FEMA
SALT LAKE COUNTY
Communities
Salt Lake City Segment Faults
Very High Liquifaction Susceptibility
USGS ShakeMap (MMI)
I (Not Felt)
II - III (Weak)
IV (Light)
V (Moderate)
VI (Strong)
VII (Very Strong)
VIII (Severe)
IX (Violent)
X+ (Extreme)
August 15, 2013
N
0
5
10
Miles
ID
WY
NV
CO
AZ
NM

Map 1.


Salt Lake County
Historical Earthquake Epicenters
& Surface Fault Rupture Hazard
Salt Lake City International Airport
Salt Lake City
South Salt Lake
Magna
West Valley City
Taylorsville
Holladay
Murray
Cottonwood Heights
Midvale
West Jordan
SALT LAKE
South Jordan
Draper
Riverton
Bluffdale
Herriman
Highland
N
0 1 2 4 6 8
Miles
Historical Earthquakes
1962-1993
Magnitude
-0.50 - 1.00
1.01 - 2.00
2.01 - 3.00
3.01 - 4.00
4.01 - 6.00
Faults
Surface Fault Rupture

Map 2. Salt Lake County Earthquakes, 1962-1993



Map 3 (figure 4) from Earthquake-Hazards Scenario for a M 7 Earthquake on the Salt Lake City Segment of the Wasatch Fault Zone, Utah, Utah Geological Survey Special Study 111, 2004.

4.2.2. Flood

Floods are related to fast snowmelt, heavy rainfall, or failure of natural or engineered impoundments onto river banks and adjacent floodplains. Floodplains are lowland areas near rivers, lakes, reservoirs, oceans and low terrain urban areas that are subject to recurring floods. Stream flooding occurs when the peak discharge, or rate of flow in cubic feet per second (cfs), is larger than the channel of the river or storm sewer capacity. In West Valley City, urban areas are prone to flooding because urban development such as buildings, streets, and parking lots prevent water infiltration into the soil and greatly increase runoff. Undersized piping, manmade drainage channels, or debris that obstructs passageways may further contribute to flooding. Flood damage includes saturation of land and property, erosion, deposition of mud and debris, and fast flowing water. Most injuries and deaths occur from fast moving floodwaters, while most property damage results from inundation by sediment-filled water.

West Valley City has no recurring loss properties identified under the National Flood Insurance Program (NFIP).

Snowmelt floods: These are caused by rapid spring snowmelt of mountain snowpacks. Most times, intense spring rainfall assists the flood scenario, causing additional rapid river rises. These events can last for weeks during the spring (generally April-June) and may result in loss of life and extensive damage affecting property owners and municipalities. More damage is occurring over the years as a result of increased development near the riverbanks of mountain streams (UNHH 2008). Snowmelt risk is greatest when snowpack is at or above normal and/or accompanied by an abrupt warming trend.

Flash-flooding: These are caused by intense thunderstorms and resultant intense rainfall. Intense rainfall may fall on areas of sparse vegetation, steep slopes, and impervious surfaces, and is then channeled into smaller waterways or conduits. Once the large volume of runoff begins to accumulate across the basin, it typically increases in volume and speed in a short time. Events are often short-lived, but very dangerous for those caught in a confined area, such as a canyon, during the time of the flood. (UNHH 2008). Flash flooding has caused 32 fatalities in Utah since 1950 (NOAA, Know Your Risk)

Areas of localized flooding may occur in urban areas not associated with existing waterways. Rain from high intensity thunderstorms may accumulate in low lying areas with no outlet or where storm drains have become overwhelmed. These types of flood and the resulting impacts are difficult to anticipate due to the uncertainty of when and where such storms will occur.

Long-term rainfall events: These rain events occur mostly in the fall or winter months and are produced by large synoptic weather systems originating out of the south, southwest, or west that produce rainfall for an extended period. Some melting of snow may occur as a result of the rainfall. Occur mainly in the southern half of the state (UNHH 2008).

Flooding Hazard Profile

Potential Magnitude			Probability		
		Catastrophic (>50%)			Highly Likely
	X	Critical (25-50%)		X	Likely
		Limited (10-25%)			Possible
		Negligible (< 10%)			Unlikely
Location	Largely in and along floodplains (See Maps 5,6, and 7); debris flows could cause natural damming of water if nearby streams were to become blocked.				
Seasonal Conditions	Spring, heavy rainfall, and spring snowmelt runoff.				
Conditions	Thunderstorms w/heavy rainfall, extended wet periods.				
Duration	Flooding can last anywhere from hours to days and even months.				
Secondary Hazards	Raw sewage/health risk, electrical fires, gas spills.				
Analysis Used	Review of FIS, FIRM, Army Corp of Engineers Flood Study.				

Profile 1.

Location and Extent

Flooding in West Valley City is typically the result of excessive snowmelt runoff and/or heavy rainfall. Snowmelt flooding is usually the result of rapid melting of snowpack and occurs between April through June and occurs along the major existing streams and waterways. Thunderstorms can produce high intensity, short duration heavy rainfall that occurs over a relatively small area in the summer months. However, flooding can also occur from non-thunderstorm rainfall events.

The flows of the Jordan River from Utah Lake into West Valley City are controlled and the flood potential from is somewhat reduced upstream of the major Jordan River tributaries. Parley's Creek has flood storage capacity at Mountain Dell and Little Dell Reservoirs and is routed through a retention basin in Sugarhouse Park. Big and Little Cottonwood Creeks and have a number of smaller flood storage lakes and ponds providing some flood protection, such as Wheeler Historic Farm. In Salt Lake City, Emigration Creek and Red Butte Creek come together at 700 East and 1300 South and can be discharged in or bypass Liberty Park pond. Parley's Creek discharges to the 1300 South drain at State Street.

History:

The following flood events are of notable significance:

- ***2011*** - Large snowpack meant larger resulting spring runoff flows
- ***2010*** - Spring snowmelt combined with heavy rains caused several streams to overtop their banks
- ***1987*** – Great Salt Lake reached its all-time maximum water level (4211.6 feet)
- ***1983*** - Large snowpack was coupled with a rain-on-snow event, (City Creek diverted down State Street)
- ***1983/1984*** - Large snowpack overwhelmed Utah Lake and affected Jordan River downstream
- ***1952*** - Rapid melt of a large snowpack

During the past 149 years, the Great Salt Lake has peaked three times above 4,211 feet above sea level: 4,211.60 feet in June 1873, 4,211.50 feet in June 1986 and 4,211.60 feet in June 1987.

Vulnerability Assessment

A community assessment exercise was performed at the Risk MAP Discovery Meeting and at several community follow-up meetings. Community representatives worked together to gain a comprehensive understanding of previous flooding events and areas of concern (including future development areas), existing community studies that can be leveraged as part of the Risk MAP project, and the status of flooding mitigation actions from the Wasatch Front Regional Council Natural Hazard Pre-Disaster Mitigation Pan. The assessment exercise also helped to identify vulnerable community assets including critical facilities, socially vulnerable populations, and areas of mitigation interest. The participants identified and prioritized several future flood study needs. A number of potential mitigation actions were identified and will be described in the Mitigation Strategies section.

The following loss estimates were provided by FEMA Region VIII, Sept 2013 as part of the Mitigation Planning/Risk MAP partnership.

Structure Exposure and Hazus-Generated Losses

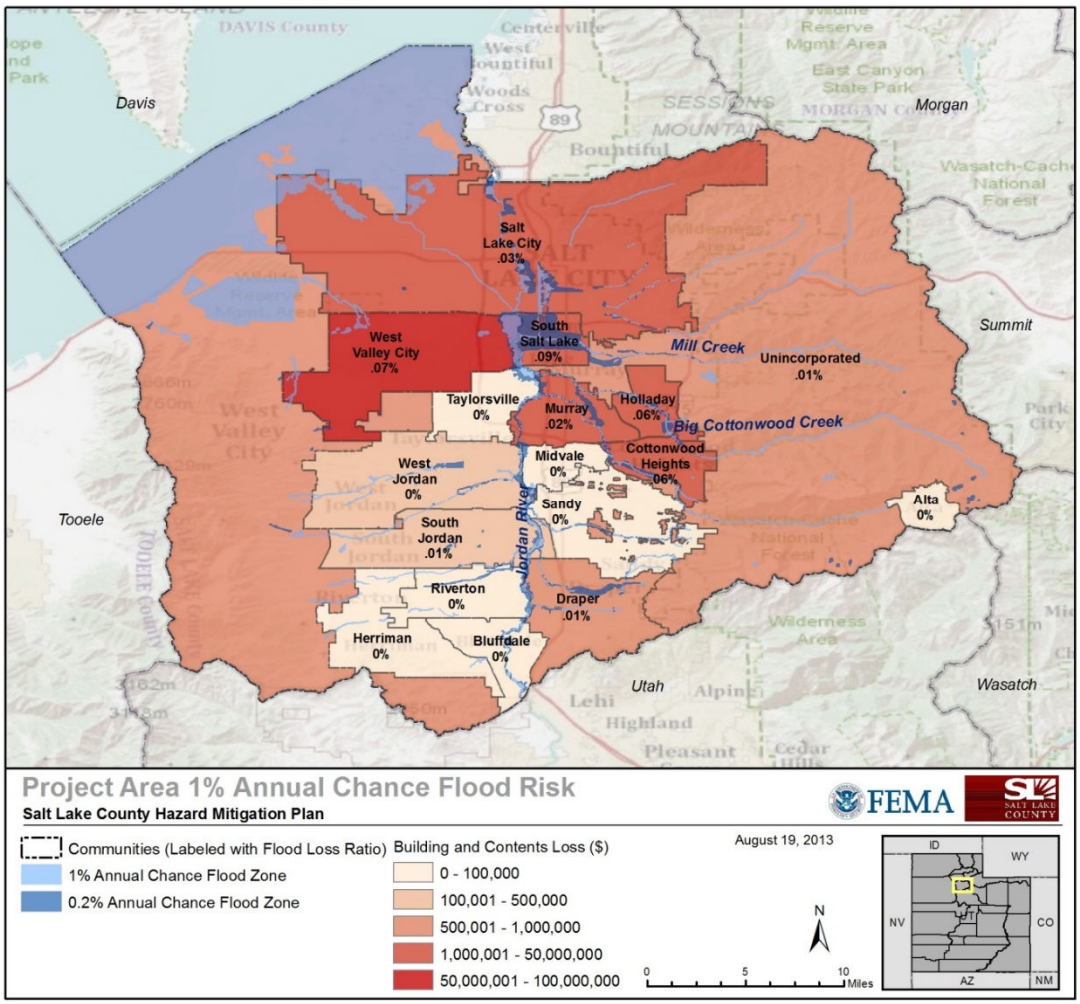
	1% Annual Chance			0.2% Annual Chance		
Jurisdiction	Structure Exposure	Building and Contents Loss*	Loss Ratio**	Structure Exposure	Building and Contents Loss	Loss Ratio
West Valley City	399	$ 90,923,943	0.704%	173	$ 4,741,553	0.04%
County Total	**1,533**	**$ 118,217,947**		**6,763**	**$ 320,309,430**	**0.23%**

Table 16*Data not available for 1% annual chance loss calculation for x structures. More detail on structures without associated losses available in jurisdictional tables. Structure count is accurate.

**Ratio of damages/losses by hazard and total building inventory.

Population Exposure

1% Annual Chance	7,421
0.2% Annual Chance	23,126



Map 5.

Agricultural Losses

Agricultural losses are listed in Table 18. Losses are computed according to the number of days in which the crops are inundated with water. All numbers are estimated for a flood occurring near April 15th.

	100-year Losses Day 3	100-year Losses Day 7	500-year Losses Day 3	500-year Losses Day 7
Barley	$45,134	$60,179	$49,078	$65,438
Corn Silage	$565,932	$754,577	$566,310	$820,518

Table 18. Agricultural Losses, April 15th Scenario

Vehicle Losses

Table 19 contains losses for vehicles in floods during both daytime and nighttime scenarios. The scenarios assume ninety percent (90%) of vehicles being removed from hazard areas due to warning.

Category	100-year	500-year
Daytime Scenario	$8,934,176	$12,019,101
Nighttime Scenario	$16,956,505	$21,976,899

Table 19. Vehicle Losses

Debris Removal

Table 20 shows how much debris would be generated by flooding and how many loads it would take to remove the debris, based on a capacity of 25 tons per load. One truck can likely haul one

load per hour. A second debris removal issue is landfill space. Fifty thousand tons at a weight-to-volume ratio of one ton per cubic yard would cover more than ten acres to a depth of three feet.

Category	100-year	500-year
Finishes	37,402 tons/1,497 loads	44,481 tons/1,780 loads
Structures	64,725 tons/2,589 loads	69,936 tons/ 2,798 loads
Foundations	61,660 tons/2,467 loads	66,747 tons/2,670 loads
Totals	163,786 tons/6,553 loads	181,164 tons/7,248 loads

Table 20. Debris Generation and Removal

4.2.3. Wildfire

Wildfires are not applicable in West Valley City

4.2.4. Landslide and Slope Failure

Landslides and Slope failure are not applicable in West Valley City.

4.2.5. Severe Weather

Severe Storms: Severe storms can include thunderstorms, lightning, hailstorms, heavy snow or rain. These storms are generally related to high precipitation events during the summer and winter months and can happen anywhere in the region. Damage can be extensive especially for agriculture, farming, and transportation systems; they can also disrupt business due to power outages.

Severe Thunderstorms: Severe thunderstorms are storms that either produce tornadoes, winds 58 mph or greater, wind damage, and/or hail three-quarters of an inch or larger in diameter. Thunderstorms can also lead to flash flooding from heavy rainfall.

Strong, rising air currents bring warm, moist air from the surface into the upper atmosphere where it condenses forming heavy rains, hail, strong winds and lightning. Based on historical evidence thunderstorms can strike anywhere in the region, mainly during the spring and summer months.

Hailstorms: Hailstorms occur when freezing water (in thunderstorm clouds) accumulates in layers around an icy core generally during the warmer months of May through September. Hail causes

damage by battering crops, structures and automobiles. When hailstorms are large, damage can be extensive, especially when combined with high winds.

Heavy Precipitation: Heavy amounts of precipitation from rain or snow can result in flash flood events. The Wasatch Front has been susceptible to these types of storms because of close proximity to the mountain ranges. Major winter storms can produce five to ten times the amount of snow in the mountains than in the valley locations. Heavy snow can cause a secondary hazard in avalanches.

Tornado: (Map 8-5) A tornado is a "violently rotating column of air extending from a thunderstorm to the ground". Some tornadoes can have wind speeds greater than 250 mph with a damage zone 50 miles long and greater than a mile wide. Although they are less common in the Intermountain Region, an average of 3 tornadoes per year occurs in Utah. Examples are the Salt Lake City tornado August 11, 1999 and the Manti tornado in 2002. Most tornadoes in Utah typically have winds less than 110 mph (F2 or smaller), and no wider than 60 feet and are on the ground no longer than a few minutes.

Historically, atmospheric conditions have not been favorable for tornado development in Utah due to a dry climate and mountainous terrain. Utah is one of the lowest ranked in the nation for incidences of tornadoes with only one F2 or stronger tornado every seven years. Utah averages about two tornados per year which typically occur between May and August.

Despite this fact, interactions of the relatively cool air of the Great Salt Lake and relatively warm air of urban areas could create situations more favorable for tornado development. This phenomenon possibly contributed to the formation of the August 1999 Salt Lake City tornado (Dunn and Vasiloff 2001). The $170 million in damages caused by this tornado make it the costliest disaster in Salt Lake County history.

Tornado distribution for the region (Map 13) suggests many tornadoes are funnel clouds aloft coming into contact with the increasing elevation of the region's foothills and mountains.

Lightning: Lightning is the electric discharge between clouds or from a cloud to the earth. Lightning casualties occur most frequently during the summer monsoonal flow in July and August. Lightning is consistently one of the top three causes of weather-related deaths in the country, claiming more lives on average than tornadoes. In the U.S., an average of 400 individuals are struck by lightning per year, and an average 67 lives are lost per year.

In Utah, lightning causes the highest number of weather-related fatalities (NWS 2008). Lightning has claimed 65 (61 according to UHMP, +42 injuries) lives in Utah since 1950, more than any other

thunderstorm-related hazard. 8 of those fatalities were within Salt Lake County.

Lightning is also the primary cause of wildland fires in Utah (NWS 2008), which could cause casualties or be disruptive to the economy. $4-5 billion is lost each year due to structural and wildland fire ignitions, and an additional $2 billion in costs to airline operations and passenger delays (UNHH 2008).

High winds: High winds can occur with or without the presence of a storm and are unpredictable in regards to time and place. West Valley City has experienced high winds in the past, and can expect future events.

Straight-line winds produced by thunderstorms are any winds not associated with the rotation of a tornado. Straight-line winds are responsible for most thunderstorm wind damage, and speeds can exceed 125 mph. Other damaging winds originating from thunderstorms include downbursts and microbursts. Utah has also experienced down slope wind events, which occur when wind generated as a deep layer of air is forced over a barrier. Winds accelerate down mountain slopes and generate high winds in a wave region formed at the base of the terrain. A down slope windstorm in December 2011 generated numerous reports of 60-80 mph winds, and maximum gusts of 80-100 mph in the Bountiful/Centerville area, resulting in loss of power and significant damage in the region (NWS 2012, Definitions for Severe Weather
Canyon winds can bring wind gusts greater than 100 mph through the canyon mouths into the populated areas of the Wasatch Front. Winds are usually strongest near the mouths of canyons and have resulted in the loss of power and the inability to heat homes and businesses. Winds have also damaged roofs, destroyed and knocked down large trees and fences, overturned tractor trailers and railroad cars, and downed small airplanes.

Winter Storms: Winter storms can pose a significant threat due to vehicle traffic accidents on icy roads, prolonged exposure to cold, damage to electrical, telephone or communication systems from ice or heavy snow accumulation, and indirectly related health threats such as individuals suffering heart attacks while shoveling snow. Prolonged exposure to cold can cause frostbite or hypothermia and can become life threatening. Winter weather can also have significant economic costs associated with snow removal, revenue and wage losses from road and airport delays or closures, flooding damage from rapid snowmelt, and agricultural and timber losses from frost and ice (UNHH 2008).

Fog: Temperature inversions often occur during the winter months as a result of high pressure trapping cold air in the valley. These inversions keep cold, moist air trapped on the Wasatch Front valley floor forming super-cooled fog. This fog can cause visibility restrictions and icy surfaces. Wind is needed to clear the inversion and fog. The Great Salt Lake has been shown to affect the prevalence of fog, especially when lake levels are high (Hill 1987).

Extreme Temperatures: Temperatures in Utah can reach the extreme ends of the thermometer. Winter months often experience temperatures below zero degrees Fahrenheit. Summer temperatures regularly reach into the nineties with many days above 100 degrees Fahrenheit. Drastic temperature changes also occur, even in matter of hours. Temperature swings in such a short period of time can cause severe emotional stress in people, sometimes resulting in suicide.

Sub-zero temperatures occur during most winters; however, prolonged periods of extremely cold weather are infrequent. An exception was January 2013, the coldest month on record for Salt Lake City since 1949, with a mean temperature of 19.4 degrees (10.1 degrees below normal), average daily maximum temperature of only 26.6 degrees, and extended periods of inversions. January is generally the coldest month of the year. Historically, extreme cold in the region has disrupted agriculture, farming and crops. Especially vulnerable to extreme cold are the young, elderly, homeless and animals. Wind chill can further the effects of extreme cold.

Extreme heat is "summertime weather that is substantially hotter and/or more human than average for a location at that time of year" (EPA 2006). Extreme heat not only causes discomfort, but personal health can be affected through heat cramps, heat exhaustion or heat stroke, particularly affecting vulnerable populations such as the very young, elderly, poor, and homeless. Extreme heat places a substantial burden on power grids through widespread use of evaporative coolers and air conditioning. This strain can lead to brownouts or blackouts leaving many without power.

Freezing Rain: Freezing rain is rare in Salt Lake County, but occurs on occasion. A freezing rain storm occurred along the Wasatch Front in the record cold January of 2013, causing the closure of all runways at the Salt Lake City International Airport and resulting in numerous traffic accidents. (Deseret News Published: Thursday, Jan. 24 2013)

Extreme Temperature Hazard Profile

Potential Magnitude		**Catastrophic (>50%)**	**Probability**	X	**Highly Likely**
		Critical (25-50%)			**Likely**
	X	**Limited (10-25%)**			**Possible**
		Negligible (< 10%)			**Unlikely**
Location	Occur in localized areas throughout the county. Although many severe weather phenomena generally have recognizable patterns of recurrence, it is difficult to identify exactly when and where the next event will take place.				
Seasonal Pattern	Year round.				
Conditions	Vary based on latitude, elevation, aspect and land forms.				

Duration	Severe weather hazards generally last hours, some conditions can persist for days.
Secondary Hazards	Wildfire, flooding.
Analysis Used	National Climate Data Center, National Weather Service, Utah Avalanche Center, UDEM, local input, and review of historic events and scientific records.

Profile 4.

4.2.6. Dam Failure

Dam Failures are not applicable in West Valley City.

4.2.7. Avalanche

Snow avalanche are not applicable in West Valley City.

4.2.8. Public Health Epidemic/Pandemic

A pandemic is a worldwide disease outbreak. An influenza pandemic occurs when a new Influenza A virus emerges and there is little or no immunity in humans. An influenza pandemic occurs when a new, virulent strain of the influenza virus circulates globally. Because the virus is new, there is little to no immunity among the population, and the virus can be easily transmitted, and has the ability to make many people very sick in a relatively short period of time. A pandemic influenza virus causes serious illness and spreads easily from person-to-person. It could be mild, moderate, or very severe even leading to death (SLVHD Family Emergency Preparedness Guide).

Influenza is caused by a virus that is spread from person-to-person primarily through respiratory droplets generated from coughing or sneezing. Transmission is most efficient among crowded populations in enclosed spaces. The virus may persist in the environment for several hours, particularly in cold and low humidity. It spreads rapidly because it has a short incubation period (period between infection and onset of symptoms) of 1-3 days and because persons are infectious (able to transmit the virus to others) during early illness or even before the onset of symptoms. (SLVHD 2010)

Pandemics are different from other types of natural hazards. They may have a much wider geographic impact, last several months, the evidence tends to be less visible, casualties are predominantly human rather than material or structural, state and federal aid resources may be limited, and the economic impacts may be more widespread.

A widespread outbreak of influenza could require temporary changes in many areas of society, such as schools, work, transportation, and other public services. Although the most effective tool for mitigating a pandemic is a well-matched vaccine, it is likely no perfectly matched vaccine will be available for a new virus for several months. There may also be insufficient quantities of antiviral medications (CDC Pre-Pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation). Therefore, mitigation measures are designed to limit the impact on the community by slowing transmission, limiting opportunities for exposure, and delaying the outbreak peak to lessen the impact on the health care system. (SLVHD 2010) Social distancing measures could be implemented where public gatherings such as sporting events, church meetings, schools, and others would be closed to prevent further spread of the disease. (SLVHD FEPG)

The Pandemic Severity Index is a tool to assess the severity of pandemic illness and appropriate mitigation measures to implement.

	Pandemic Severity Index		
Interventions* by Setting	**1**	**2 and 3**	**4 and 5**
Home			
Voluntary isolation of ill at home (adults and children); combine with use of antiviral treatment as available and indicated	Recommend†§	Recommend†§	Recommend †§
Voluntary quarantine of household members in homes with ill persons¶ (adults and children); consider combining with antiviral prophylaxis if effective, feasible, and quantities sufficient	Generally not recommended	Consider **	Recommend **
School **Child social distancing**			
-dismissal of students from schools and school based activities, and closure of child care programs	Generally not recommended	Consider: ≤4 weeks††	Recommend: ≤12 weeks§§
-reduce out-of school social contacts and community mixing	Generally not recommended	Consider: ≤4 weeks ††	Recommend: ≤12 weeks§§
Workplace / Community **Adult social distancing**			
-decrease number of social contacts (e.g., encourage teleconferences, alternatives to face-to-face meetings)	Generally not recommended	Consider	Recommend
-increase distance between persons (e.g., reduce density in public transit, workplace)	Generally not recommended	Consider	Recommend
-modify, postpone, or cancel selected public gatherings to promote social distance (e.g., stadium events, theater performances)	Generally not recommended	Consider	Recommend
-modify work place schedules and practices (e.g., telework, staggered shifts)	Generally not recommended	Consider	Recommend

Pandemic Hazard Profile

Potential Magnitude			**Probability**		
		Catastrophic (>50%)			**Highly Likely**
	X	**Critical (25-50%)**		**X**	**Likely**
		Limited (10-25%)			**Possible**

		Negligible (< 10%)			Unlikely
Location	May occur throughout the city. It is difficult to identify exactly when and where the next event will take place.				
Seasonal Pattern	Primarily fall and winter, with potential impacts year round.				
Conditions	Variable timeframe and variable severity. Once novel virus is introduced to the area, person-to-person transmission may spread virus rapidly.				
Duration	4-6 weeks to several months, possibly up to a year				
Secondary Hazards	Social and economic consequences, possible surge on healthcare resources.				
Analysis Used	Salt Lake Valley Health Department, Center for Disease Control, UDEM, local input, and review of historic events and scientific records.				

Profile 7

Location and Extent

No defined geographic extent. Pandemics can spread throughout the county/region/state & beyond.

History

The Great Pandemic of 1918-1919 was the first reported pandemic in the County. The first cases in Utah undoubtedly appeared in the military camp at Fort Douglas. Like many states with a large rural population, Utah did not provide a report to the Public Health Service in the early weeks of the pandemic. This may have been because they were overwhelmed by the spread of the disease or it may have been because the state did not have enough public health officials available to make the weekly reports the Public Health Service demanded. Utah's Pandemic Preparedness Plan was first released in 2005, http://health.utah..gov/epi/diseases/flu/ClinicianPublicHealth/pandemic/pandemic influenza plan.pdf

Vulnerability Assessment

Individuals, families, employers, and communities will all experience difficulties dealing with community mitigation measures. Many problems will come from having children dismissed from schools and childcare programs. There are 546,000 children less than 18 years old currently in school in Utah, accounting for 21.8% of the population. An additional 205,000 residents (8.2%) are enrolled in college. Dismissing students from school would directly disrupt the schedule of 30% of the population. Secondary disruptions would occur for parents who would need to balance working with tending their children. Tertiary disruptions would occur for employers with absent employees that must stay home to care for children and could potentially result in workplaces closing or reducing operations and limiting the availability of essential services. Additionally

156,000 (17.9%) of Utah residents live alone; 30.1% are 65 years of age and older. Persons who live alone may be unable to follow isolation requirements if they need to acquire medications or shop for other essentials. (SLVHD 2010)

Characteristics	Pandemic Severity Index				
	Category 1	Category 2	Category 3	Category 4	Category 5
Case Fatality Ratio (percentage)	<0.1	0.1-<0.5	0.5-<1.0	1.0-<2.0	>=2.0
Excess Death Rate (per 100,000)	<30	30-<150	150-<300	300-<600	>=600
Illness Rate (percentage of the population)	20-40	20-40	20-40	20-40	20-40
Potential Number of Deaths (based on 2008 population estimate*)	<312	312-<1,562	1,562-<3,125	3,125-<6,249	>=6,249
20th Century UT experience	Seasonal Influenza (illness rate 5-20%)	1957, 1968 Pandemic	None	None	1918 Pandemic

Table 31.

Community Mitigation Plan, Appendix H to the Salt Lake Valley Health Department Pandemic Influenza Preparedness and Response Plan

4.2.9. Drought

According to the National Drought Mitigation Center, drought is a "deficiency of precipitation over an extended period of time, resulting in a water shortage for some activity, group, or environmental sector." Although variation in the amount of precipitation recorded each year is normal, a drought is beyond these norms in terms of low precipitation for an extended period or over a large area. While most natural hazards are sudden and result in immediate impacts, droughts "sneak up on us quietly disguised as lovely sunny weather" (McKee, Doesken, and Kleist 2005) and can last a long time resulting in significant socioeconomic impacts. Drought can be categorized according to unique characteristics and may be thought of as phases of the same drought (UNHH 2008).

- Meteorological drought: a measure of departure of precipitation from normal for a particular location.

- Agricultural drought: where the amount of moisture in the soil no longer meets the needs of a particular crop.
- Hydrological drought: when surface and subsurface water supplies are below normal.
- Socioeconomic drought: when dry conditions persist long enough and are severe enough to impact sectors beyond the agricultural community, such as community drinking supply and other social and economic enterprises.

Although the agricultural community is usually the most heavily impacted by drought, direct and indirect impacts extend into economic, social, or environmental sectors as well (UNHH 2008).

4.0 or more	Extremely wet
3.0 to 3.99	Very wet
2.0 to 2.99	Moderately wet
1.0 to 1.99	Slightly wet
0.5 to 0.99	Incipient wet spell
0.49 to -0.49	Near normal
-0.5 to -0.99	Incipient dry spell
-1.0 to -1.99	Mild drought
-2.0 to -2.99	Moderate drought
-3.0 to -3.99	Severe drought
-4.0 or less	Extreme drought

Table 32. Palmer Drought Severity Index (NDMC 2006)

The Palmer Drought Severity Index (PDSI) developed by Wayne Palmer in the 1965, measures drought severity using temperature, precipitation and soil moisture (Utah Division of Water Resources 2007a). The PDSI has become the "semi-official" drought index as it is standardized across various climates. The index uses zero as normal and assigns a number between +6 and -6, with dry periods having negative numbers and wet periods expressed using positive numbers (Table 8-2) (NDMC 2006).

Times of extended drought can turn into socioeconomic drought, or drought that begins to affect the general population. When this occurs, reservoirs, wells and aquifers are low and conservation measures are required. Some forms of water conservation are water-use restrictions, implementation of secondary water or water recycling and xeriscaping. Other conservation options include emergency water agreements with neighboring water districts or transporting water from elsewhere.

Drought Hazard Profile

Potential Magnitude		***Catastrophic (>50%)***	***Probability***		***Highly Likely***
	X	***Critical (25-50%)***		***X***	***Likely***
		Limited (10-25%)			***Possible***
		Negligible (< 10%)			***Unlikely***
Location	Countywide.				
Seasonal Pattern	Impacts typically noticeable in summer, conditions can be year round.				
Conditions	*Meteorological Drought:* Lack of precipitation *Agricultural Drought:* Lack of water for crop production *Hydrologic Drought:* Lack of water in the entire water supply *Socioeconomic Drought:* Lack of water sufficient to support population				
Duration	Months, Years				
Secondary Hazards	Wildfire, dust storms, air quality.				
Analysis Used	National Weather Service, Utah Climate Center, Utah Division of Water Resources, Newspapers, Local input.				

Profile 8

Location and Extent

Utah is the second driest state in the nation. Drought dramatically affects this area because of the lack of water for agriculture and industry, which limits economic activity, irrigation and culinary uses. The severity of the drought results in depletion of agriculture lands and deterioration of soils. In the Wasatch Front region, the risk of drought is high.

The most severe drought period in recorded history for the North Central and Northern Mountains regions occurred in 1934 at the height of the Great Depression and during the same drought period (1930 to 1936) that caused the “Dust Bowl” on the Great Plains. The longest drought period varies from 11 years for the North Central region (1953-1963), and 6 years for the Northern Mountains (twice; 1900-1905 and 1987-1992) (Utah Division of Water Resources 2007a).

Vulnerability Assessment

Due to the unpredictability of drought, it is difficult to identify the areas most threatened and to provide loss estimate values. Utah is currently experiencing drought conditions, yet reports are not yet available on the impact of the current drought. However, historical drought records demonstrate that agriculture is typically the economic sector most impacted by drought (UHMP). The 2003 Economic Report to the Governor discusses some of the statewide economic impacts of a drought beginning in 1999. Since it is not known what the local impacts of the current drought will be, this report will serve as the best available loss estimate. It is expected droughts in the future will have similar losses.

The 2003 Economic Report to the Governor suggests the drought has contributed to job change. "During 2002, job change was -1.0%. Without the drought, job change might have been -0.6%, 0.4% higher than what actually occurred. The hardest hit sector was agriculture, where 2,600 jobs and almost $40 million in income were lost." Livestock sales were estimated as down $100 million and hay sales down $50 million due to the drought. Drought related fires are believed to contribute to a decline in tourism sales, also down $50 million. The combined effects of the drought in these three sectors resulted in a loss of over 6,100 jobs and $120 million in lost income during 2002. Construction, manufacturing, and wholesale trade were also impacted by drought.

The Utah Division of Water Resources mentions in their drought report that large and significant data gaps hinder the quantification of drought impacts in all sectors of the economy and society. They suggest that tax revenues and other potential economic indicators of drought impacts be monitored at all levels of government in order to improve evaluation methods and to better understand drought impacts. (UHMP)

The 2011 Utah Hazard Mitigation Plan conducted Drought vulnerability rankings based on agricultural information. Economic indicators include cash receipts per county, personal income from farming, number of acres of farmland per county, number of acres of cropland per county, and number of cattle per county were used to determine a county's vulnerability to drought. This vulnerability assessment resulted in a ranking by county of the potential drought impacts based on Agriculture activities. Salt Lake County was given a moderate ranking.

4.2.10. Infestation

Infestations are not applicable in West Valley City.

4.2.11. Radon

Radon is a radioactive gas released from the nuclear decay process of uranium and radium, which are trace elements of many soils. As radon moves up through the ground it can enter a home through cracks and gaps in walls and floors, cavities inside walls, gaps around service pipes, and water supply connections. Though relatively harmless at low levels, radon is classified by the EPA as a known human carcinogen and is considered the leading cause of non-smoking lung cancer in the United States. Because radon is tasteless, odorless, and invisible, it presents unique challenges in minimizing our daily exposure to this naturally occurring radiation (UNHH 2008).

Radon can be detected through an inexpensive test and can be mitigated through proper ventilation of excessive radon and installation of systems to prevent radon from entering the home.

Radon Hazard Profile

Potential Magnitude		**Catastrophic (>50%)**	**Probability**		**Highly Likely**
		Critical (25-50%)			**Likely**
	X	**Limited (10-25%)**		X	**Possible**
		Negligible (< 10%)			**Unlikely**
Location	Region wide				
Frequency	Year-round, continuous				
Conditions	Buildings over top of soils containing high amounts of decaying uranium which is commonly found in Utah.				
Duration	Years				
Secondary Hazards	Unknown				
Analysis Used	Information and maps provided by the Utah Geological Survey and the Utah Division of Radiation Control.				

Profile 11

Location and Extent

Radon gas can be found in most Utah homes. The gas comes from the small particles of uranium in rocks and soil which decay to radium. In turn, the radium breaks down further into radon. As the radon moves up through the ground, it can enter a home through cracks and gaps in walls and floors if not properly vented.

Due to the types of geologic formations found in Salt Lake County, radon gas is likely present in higher concentrations in homes in the Wasatch and Oquirrh Mountains and their foothills. Sites further from the mountains and foothills generally have lower concentrations of radon. Radon does not pose a threat to infrastructure.

Through collections of tests performed by various households in the county, households containing higher levels of radon were found to roughly follow the patterns predicted by geologic formation. One exception is the area just south of Interstate 80 in western Salt Lake City.

History

The danger of high exposure to radon in mines was known back in the 1500s. Yet, the presence of radon in indoor air was not documented until 1950. Finally in 1970, research was initiated to address sources of indoor radon, determinants of concentration, health effects, and approaches to mitigation. In 1984, a widely publicized incident in Pennsylvania escalated the problem of indoor radon and investigation intensified, with the EPA taking a strong lead to educate states via its State Indoor Radon Grant (SIRG).

EPA's grant has been partially funding the Utah Division of Radiation Control's (DRC) Indoor Radon Program that enables the Division to respond to a continuous stream of public telephone and email inquiries, provide education to homeowners and professionals, conduct "target area" indoor radon assistance and surveys, and offer individualized assistance to homeowners and public agencies concerning all aspects of the indoor radon hazard problem.

"The Division's primary goal is to assure that radiation exposure to individuals is kept to the lowest practical level," said Lundberg. "A vital mechanism in reducing radiation exposure and potentially saving lives is our Indoor Radon Program."

Radiation risk to the American public from radon gas is undisputed. According to William Field (2011), radon is the leading environmental cause of cancer mortality in the United States and the seventh leading cause of cancer mortality overall. The Harvard School of Public Health, Center for Risk Analysis, has ranked radon as the highest of ten risks of death in homes in the United States, ahead of falls and home fires.

"Radon awareness in Utah has grown steadily the past decade," said Keyser. "Already this year, we have seen the number of radon tests conducted in Utah triple from the previous year."
Radon is a **radioactive gas** created by the breakdown of Uranium and is considered radiation. Uranium is found **naturally** in soil and rocks. Normally, radon emits into the atmosphere and is harmless. Radon is:

Odorless
Colorless
Tasteless

When radon is released, it goes into the atmosphere or seeps into homes and buildings through cracks in the structure of the house. When this happens, the gas becomes trapped due to poor circulation of indoor and outdoor air. Radiation is measured in curies. A curie is a rate of disintegration of 1 gram of radium. Radon is measured in picocuries per liter, shown as pCi/L.

What are the health risks of radon? Radon decays into radioactive particles that can be trapped in the lungs when inhaled. These particles release small bursts of energy that damage lung tissue and may lead to lung cancer. Radon is the second leading cause of lung cancer in the United States. Only smoking causes more lung-cancer deaths, and smoking combined with radon is a particularly serious health risk. Chances of getting lung cancer are higher from the combination of smoking and radon than from either source alone. Not everyone who is exposed to radon develops the disease, but the chances increase with increasing levels of radon and length of exposure. The amount of time between exposure and onset of the disease is usually many years.

Capability Assessment Survey

Jurisdiction: *West Valley City* Point of Contact/Title: *Chief John Evans*

Phone: 801-963-3337 E-mail: john.evans@wvc-ut.gov

1.Planning and Regulatory Capability: Please indicate whether the following planning or regulatory tools and programs are currently in place or under development for your jurisdiction by placing an "X" in the appropriate box, followed by the date of adoption/update. Then, for each particular item in place, identify the department or agency responsible for its implementation and indicate its estimated or anticipated effect on hazard loss reduction (Supports, Neutral or Hinders) with the appropriate symbol and also indicate if there has been a change in the ability of the tool/program to result in loss reduction. Finally, please provide additional comments or explanations in the space provided.

Tool/Program	***Status***			***Dept. / Agency Responsible***	***Comments:***
	In Place	***Date Adopted or Updated***	***Under Develop-ment***		
Hazard Mitigation Plan					
Emergency Operations Plan	**X**	**05/2012**		**EM**	
Disaster Recovery Plan	**X**	**05/2012**		**EM**	
Evacuation Plan	**X**		**X**	**EM**	
Continuity of Operations Plan	**X**	**07/2013**		**EM**	

NFIP					
NFIP-CRS					
Floodplain Regulations	X	10/2009		Public Works	
Floodplain Management Plan			X	Public Works	
Zoning Regulations	X	On-Going		CED	

Tool/Program	*Status*			*Dept. / Agency Responsible*	*Comments:*
	In Place	*Date Adopted or Updated*	*Under Develop-ment*		
Subdivision Regulations	X	On-Going		CED	
Comprehensive Land Use Plan (or General, Master or Growth Mgmt. Plan)	X	On-Going		CED	
Open Space Management Plan (or Parks/Rec or Greenways Plan)	X	On-Going		CED Parks/Rec	
Stormwater Management Plan / Ordinance	X	1/2014		Public Works	

Natural Resource Protection Plan			X	Public Works	
Capital Improvement Plan	X	Every Budget		Administration	
Economic Development Plan	X		X		
Historic Preservation Plan			X	Public Works	
Farmland Preservation			X	Public Works	
Building Code	X				Current Code
Fire Code	X				Current Code
Other					

2.Administrative and Technical Capability: Please indicate whether your jurisdiction maintains the following staff members within its current personnel resources by placing an "X" in the appropriate box. Then, if YES, please identify the department or agency they work under and provide any other comments you may have in the space provided or with attachments.

Staff/Personnel Resources	*Yes*	*No*	*Department / Agency*	*Comments*

Planners (with land use / land development knowledge)	X		CED	
Planners or engineers (with natural and/or human caused hazards knowledge)	X		CED Public Works	
Engineers or professionals trained in building and/or infrastructure construction practices (includes building inspectors)	X		CED	
Emergency manager	X		Fire	
Floodplain manager	X		Public Works	
Land surveyors	X		Public Works	
Scientists or staff familiar with the hazards of the community		X		
Personnel skilled in Geographic Information Systems (GIS) and/or FEMA's HAZUS program	X		MIS	
Grant writers or fiscal staff to handle large/complex grants	X		Finance	
Other				

3. Financial Capability: Please indicate whether your jurisdiction has access to or is eligible to use the following local financial resources ***for hazard mitigation purposes*** (including as match funds for State of Federal mitigation grant funds). Then, identify the primary department or agency responsible for its administration or allocation and provide any other comments you may have in the space provided or with attachment

Financial Resources	Yes	No	Department / Agency	Comments
Capital improvement programming	X		Finance	
Community Development Block Grants (CDBG)	X		Administration	
Special purpose taxes	X		Finance	
Gas / electric utility fees		X		
Water / sewer fees		X		Separate Districts
Stormwater utility fees	X		Public Works	
Development impact fees	X		All Departments	
General obligation, revenue, and/or special tax bonds	X		Finance	
Partnering arrangements or intergovernmental agreements		___		

Other		___		

4.Education and Outreach: West Valley City will provide education to citizens with religious group, community fairs, school programs, and CERT. We will provide specific training as requested.

Program/Organization	*Yes*	*No*	*Department / Agency*	*Comments*
Firewise Communities Certification		X		
StormReady certification		X		
Natural disaster or safety related school programs		X		

Ongoing public education or information program (e.g. responsible water use, fire safety, household preparedness, environmental education)	X		Fire EM Police	
Public-private partnership initiatives addressing disaster-related issues	X		EM	
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	X		EM	
Other				

Area	Degree of Capability		
	Limited	Moderate	High
Planning and Regulatory			X
Administrative and Technical			X
Financial			X

Education and Outreach		X	

6 Mitigation Strategy

6.1 West Valley City progress on the 2009 Wasatch Front Mitigation Plan

2009 Mitigation Strategies Progress and Summary

The following mitigation strategies were formulated by the Salt Lake County Mitigation Strategies Working Group for inclusion in the 2009 *Wasatch Front Region Natural Hazard Pre-Disaster Mitigation Plan*, which was adopted by the West Valley City on October 6, 2009. The following summary highlights the West Valley City efforts to implement those goals where applicable and practical as part of the County's overall mitigation planning efforts.

For actions not completed or implemented by the West Valley City, a short description is provided as to why it was not relevant or if it is included as part of the updated plan.

Category	Goal / Objective	Action	Status	Comments
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.1 – Improve communication capabilities	1 – Conduct an inventory and assessment of communications equipment and systems and identify needs	In Process	Currently we have upgraded radio and comms systems. Inventory of all local assests complete
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.1 – Improve communication capabilities	2 – Conduct Training and awareness activities on communication equipment, tools, and systems	In process	We have trained all personnel working in emergency operations
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.1 – Improve communication capabilities	3 – Establish agreements to share communications equipment between agencies involved in emergency operations	In process	Working with Salt Lake County
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.1 – Improve communication capabilities	4 – Establish notification capabilities and procedures for emergency personnel	Done	Worked with Dispatch and reverse 911 for our system

Category	Goal / Objective	Action	Status	Comments
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.2 – Maintain communications capabilities for critical facilities	1 – Evaluate vulnerability of critical communications systems	In process	Looking at each emergency to see weakness
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.2 – Maintain communications capabilities for critical facilities	2 – Establish redundancy for dispatch centers and other critical communications	In process	VECC is working with all local centers for redundant 911
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.3 – Conduct communications Strategic Planning	1 – Establish a coordinating group to address long-term communication needs and implementation strategies	In process	Working with City comms group for this
All Hazards	1 – Improve and maintain communications capabilities for emergency operations 1.3 – Conduct communications Strategic Planning	2 – Acquire, upgrade, and/or integrate communications equipment and systems as determined by coordinating group	In process	Budget issue upgrading as we can with current budgets
All Hazards	2 – Improve awareness and analysis of hazards 2.1 – Improved Quality and Access to digital geographic (GIS) hazards data	1 – Establish a coordinating group to address geographic data issues	In process	Looking at hazards with mapping and GIS
All Hazards	2 – Improve awareness and analysis of hazards 2.1 – Improved Quality and Access to digital geographic (GIS) hazards data	2 – Examine current data availability and sharing capabilities, evaluate needs, and identify shortcomings	On Going	We are continually looking at evaluations of all hazards

Category	Goal / Objective	Action	Status	Comments
All Hazards	2 – Improve awareness and analysis of hazards 2.1 – Improved Quality and Access to digital geographic (GIS) hazards data	3 – Update and expand data on hazards, critical facilities, and critical infrastructure according to assessed needs	In process	Done update to our plan and facilites
All Hazards	2 – Improve awareness and analysis of hazards 2.1 – Improved Quality and Access to digital geographic (GIS) hazards data	4 – Provide centralized access to geographic data to emergency planners and responders	In process	Completing pre incident plans on major facilities
All Hazards	2 – Improve awareness and analysis of hazards 2.2 – Improve and expand hazard monitoring capabilities	1 – Integrate existing hazard monitoring networks in emergency operations centers. Utilize sensors such as weather stations, stream gages, seismograph stations, road conditions, etc.	No Progress	Funding and personnel
All Hazards	2 – Improve awareness and analysis of hazards 2.2 – Improve and expand hazard monitoring capabilities	2 – Identify and implement additional hazard monitoring capabilities.	No Progress	Funding and personnel
All Hazards	3 – Ensure critical facilities can sustain operations for emergency response and recovery 3.1 – Prevent damage to critical facilities and infrastructure	1 – Utilize GIS to identify facilities and infrastructure at risk	In progress	Continual mapping of hazards and risks
All Hazards	3 – Ensure critical facilities can sustain operations for emergency response and recovery 3.1 – Prevent damage to critical facilities and infrastructure	2 – Assess critical facilities for hazard exposure, structural weaknesses, power, communications and equipment resources and redundancy, and adequate emergency procedures	Done	Have completed this for city owned facilities

Category	Goal / Objective	Action	Status	Comments
All Hazards	3 – Ensure critical facilities can sustain operations for emergency response and recovery 3.1 – Prevent damage to critical facilities and infrastructure	3 – Implement improvements to address identified in assessment	Done	completed this for city owned facilities
All Hazards	4 – Improve response capabilities through mutual-aid agreements 4.1 – Utilize mutual-aid agreements in accordance with National Incident Management System (NIMS) requirements	1 – Compile inventory of mutual-aid agreements and memoranda of understanding (MOU) and identify deficiencies	In process	Completed all fire and ems. Working with Public works and police now
All Hazards	4 – Improve response capabilities through mutual-aid agreements 4.1 – Utilize mutual-aid agreements in accordance with National Incident Management System (NIMS) requirements	2 – Pursue and implement needed mutual-aid agreements	In process	Fire is completed working with other disciplines
All Hazards	5 – Increase citizen safety through improved hazard awareness 5.1 – establish a comprehensive public education program	1 – Provide education regarding all natural hazards through live trainings, as well as web-based, print and broadcast media	In process	Currently working on our web page for citizens
All Hazards	5 – Increase citizen safety through improved hazard awareness 5.1 – Establish a comprehensive public education program	2 – Incorporate information about cascading effects of hazards in education programs	In process	Working with city to have continual education
All Hazards	5 – Increase citizen safety through improved hazard awareness 5.1 – Establish a comprehensive public education program	3 – Develop education programs to target specific groups including homeowners, developers, schools and people with special needs	In process	We have completed adult programs now working on a elementary school program

Category	Goal / Objective	Action	Status	Comments
All Hazards	5 – Increase citizen safety through improved hazard awareness 5.1 – Establish a comprehensive public education program	4 – Utilize maps and similar products on County EM website and other media to educate public on areas at risk to hazards	In process	Working with county
All Hazards	5 – Increase citizen safety through improved hazard awareness 5.1 – Establish a comprehensive public education program	5 – Coordinate with existing public education programs such as the American Red Cross, Utah Living with Fire, be Ready Utah, the National Weather Service, etc.	Done	All of our programs work with the groups listed
All Hazards	6 – Improve public safety through preventative regulations 6.1 – Minimize hazard impacts through the adoption of appropriate prevention measures	1 – Establish and enforce appropriate planning, zoning, and building code ordinances	Done	City building uses latest codes
All Hazards	6 – Improve public safety through preventative regulations 6.1 – Minimize hazard impacts through the adoption of appropriate prevention measures	2 – Ensure current hazard ordinances are available for viewing online	Done	Codes available at city hall
Dam Failure	1 – Include dam failure inundation in future County and City planning efforts 1.1 – Review current State dam safety information on all identified high hazard dams in the County	1 – Include dam inundation maps in current County, City and Special Service District Emergency Operations Plans	NA	Dam's not hazard in this city
Dam Failure	1 – Include dam failure inundation in future County and City planning efforts 1.1 – Review current State dam safety information on all identified high hazard dams in the County	2 – Utilize inundation maps to identify potential evacuation areas and routes	NA	Dam's not hazard in this city

Category	Goal / Objective	Action	Status	Comments
Drought	1 – Reduce and prevent hardships associated with water shortages 1.1 – Limit unnecessary consumption of water throughout the County	1 – Continue to encourage water conservation utilizing and promoting outreach material from all water districts in the County	In Process	City public works and water districts have education program but will always be ongoing
Drought	1 – Reduce and prevent hardships associated with water shortages 1.1 – Limit unnecessary consumption of water throughout the County	2 – Emergency Managers will coordinate with local water districts/public utilities to support ongoing conservation efforts	In Process	Working with water companies and County on issue
Drought	1 – Reduce and prevent hardships associated with water shortages 1.1 – Limit unnecessary consumption of water throughout the County	3 – Investigate feasibility of implementing an incentive program to encourage the use of low-flow appliances and fixtures in homes and businesses	NA	City does not own water system
Drought	1 – Reduce and prevent hardships associated with water shortages 1.1 – Limit unnecessary consumption of water throughout the County	4 – Implement water-saving devices and practices in public facilities	In process	City facilities are changing over fixtures for conservation in city owned buildings
Drought	1 – Reduce and prevent hardships associated with water shortages 1.1 – Limit unnecessary consumption of water throughout the County	5 – Repair, maintain and improve water distribution infrastructure to prevent loss from leakage, breaks, etc.		City does not own water system
Drought	1 – Reduce and prevent hardships associated with water shortages 1.1 – Limit unnecessary consumption of water throughout the County	6 – Coordinate public safety water use, such as hydrant testing		City does not own water system
Drought	1 – Reduce and prevent hardships associated with water shortages 1.1 – Limit unnecessary consumption of water throughout the County	7 – Provide information on landscaping alternatives for persons subject to green area requirements	In process	Water companies do public education

Category	Goal / Objective	Action	Status	Comments
Drought	1 – Reduce and prevent hardships associated with water shortages 1.2 – Address agricultural water shortages in the County	1 – Set up livestock water rotation in areas of agricultural use		City does not own water system
Drought	1 – Reduce and prevent hardships associated with water shortages 1.3 – Encourage development of secondary water systems	1 – Coordinate with water districts to plan for, develop and/or expand secondary water		City does not own water system
Earthquake	1 – Reduce earthquakes losses to infrastructure 1.1 – Encourage retrofit and rehabilitation of highly susceptible infrastructure	1 – Identify structures at risk to earthquake damage	In process	Working on an inventory system of facilities
Earthquake	1 – Reduce earthquakes losses to infrastructure 1.1 – Encourage retrofit and rehabilitation of highly susceptible infrastructure	2 – Research feasibility of an incentive program for retrofitting privately-owned buildings, particularly unreinforced masonry	No Progress	Funding issues
Earthquake	1 – Reduce earthquakes losses to infrastructure 1.1 – Encourage retrofit and rehabilitation of highly susceptible infrastructure	3 – Complete seismic rehabilitation/retrofitting projects of public buildings at risk	No Progress	Funding issues
Earthquake	1 – Reduce earthquakes losses to infrastructure 1.2 – Improve public education regarding earthquake risks to unreinforced masonry buildings	1 – Provide educational materials to unreinforced masonry home and business owners	Done	Provide information at all events. This will always be on going
Earthquake	1 – Reduce earthquakes losses to infrastructure 1.3 – Improve Seismic Hazard understanding and seismic resistance of CUWCD Red Butte Dam in Salt Lake County.	1 – Procure Engineering Consultant to perform the nonstructural design and geotechnical assessment and review.	None	Funding issues

Category	Goal / Objective	Action	Status	Comments
Flooding	1 – Protection of life and property before, during and after a flooding event 1.1 – Provide 100% availability of the National Flood Insurance Program	1 – Assist Cities with NFIP application		Advise citizens and businesses of program
Flooding	1 – Protection of life and property before, during and after a flooding event 1.1 – Provide 100% availability of the National Flood Insurance Program	2 – Encourage Communities to actively participate in NFIP		Provide education to citizens in EM programs
Flooding	1 – Protection of life and property before, during and after a flooding event 1.2 – Encourage appropriate flood control measures, particularly in new developments	1 – Determine potential flood impacts and identify areas in need of additional flood control structures	In process	Public works continually plans and as money is available corrects
Flooding	1 – Protection of life and property before, during and after a flooding event 1.2 – Encourage appropriate flood control measures, particularly in new developments	2 – Address identified problems through construction of debris basins, flood retention ponds, energy dissipaters or other flood control structures		Public works has completed but will always be ongoing
Flooding	1 – Protection of life and property before, during and after a flooding event 1.3 – Provide maintenance, repairs and improvements to drainage structures, storm water systems and flood control structures	1 – Establish maintenance and repair programs to remove debris, improve resistance and otherwise maintain effectiveness of storm water and flood control systems		Public works has completed but will always be ongoing
Flooding	2 – Reduce threat of unstable or inadequate flood control structures 2.1 – Reduce potential for failure of flood control structures	1 – Identify and assess structures for deficiencies		Provide education to citizens in EM programs

Category	Goal / Objective	Action	Status	Comments
Flooding	2 – Reduce threat of unstable or inadequate flood control structures 2.1 – Reduce potential for failure of flood control structures	2 – Modify structures as needed to address deficiencies		Provide education to citizens in EM programs
Severe Weather	1 – Reduce threat of loss of life or property due to extreme weather events 1.1 – Maintain status as a StormReady Community	1 – Maintain Hazardous Weather Operations Plan according to StormReady requirements	Done	Emergency plan information
Severe Weather	1 – Reduce threat of loss of life or property due to extreme weather events 1.1 – Maintain status as a StormReady Community	2 – Maintain Contact with NWS prior to re-application in 2010		Work always on plans with NWS
Severe Weather	1 – Reduce threat of loss of life or property due to extreme weather events 1.2 – Increase awareness of information services provided by NWS	1 – Meet with NWS representative on an annual basis to receive information on new services and alerts available	Done	Meeting on plans but will always be ongoing
Severe Weather	1 – Reduce threat of loss of life or property due to extreme weather events 1.2 – Increase awareness of information services provided by NWS	2 – Assist NWS in making other agencies and departments aware of available resources	In Process	As a city we have departments look at this
Severe Weather	1 – Reduce threat of loss of life or property due to extreme weather events 1.3 – Encourage safe practices in avalanche prone areas	1 – Assist Forest Service Utah Avalanche Forecast Center and other organizations in promoting avalanche hazard awareness for backcountry users	N/A	No Avalanches
Severe Weather	1 – Reduce threat of loss of life or property due to extreme weather events 1.4 – Examine the vulnerability of patrons at large event venues to extreme weather events	1 – Work with NWS to develop large event venue weather safety and evacuation procedures	In process	We are making plans for venues and weather evacuation plans

Category	Goal / Objective	Action	Status	Comments
Slope Failure	1 – Reduce or eliminate the threat of slope failure damage 1.1 – Reduce the threat of slope failures following wildfires	1 – Develop protocol for working with State and Federal agencies in reducing the impact of post-fire debris flow hazard	N/A	
Slope Failure	1 – Reduce or eliminate the threat of slope failure damage 1.2 – Monitor historic landslide areas	1 – Coordinate with the Utah Geological Survey and other agencies to understand current slope failure threats/potential	N/A	
Slope Failure	1 – Reduce or eliminate the threat of slope failure damage 1.3 – Address landslide hazards in new sub-divisions	1 – Utilize recommendations provided by the State Geological Hazards Working Group to address land-use and planning for new developments	N/A	
Wildland Fire	1 – Community education on wildfire hazard 1.1 – Reduce risk from wildfire through education programs	1 – Increase public awareness through “Firewise” program	N/A	No wildland in City
Wildland Fire	1 – Community education on wildfire hazard 1.1 – Reduce risk from wildfire through education programs	2 – Educate homeowners on the need to create defensible space near structures in WUI	N/A	No wildland in City
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.1 – Assist homeowners with creating defensible space near structures in WUI areas	1 – Designate and promote county-wide annual initiative for clearing fuels	N/A	No wildland in City

Category	Goal / Objective	Action	Status	Comments
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.1 – Assist homeowners with creating defensible space near structures in WUI areas	2 – Provide waste removal, such as chipping of green waste by public works, following designated fuel clearing day/week	N/A	No wildland in City
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.2 – Improve evacuation capabilities for WUI areas	1 – Work with experts and communities to develop or update evacuation plans	N/A	No wildland in City
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.2 – Improve evacuation capabilities for WUI areas	2 – Evaluate transportation network and address needed improvements to facilitate evacuation and emergency response	N/A	No wildland in City
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.3 – Improve addressing system in WUI areas to facilitate emergency response	1 – Identify all facilities, businesses, and residences, particularly in the canyons, and assign addresses according to current county addressing standards	N/A	No wildland in City
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.3 – Improve addressing system in WUI areas to facilitate emergency response	2 – Incorporate improved addresses in fire-dispatch and other databases	N/A	No wildland in City

Category	Goal / Objective	Action	Status	Comments
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.4 – Complete wildfire protection projects	1 – Reduce fuels around publically owned structures	N/A	No wildland in City
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.4 – Complete wildfire protection projects	2 – Implement fire breaks and other protective measures	N/A	No wildland in City
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.4 – Complete wildfire protection projects	3 – Assess existing water flow capabilities, both public and private, and address deficiencies	N/A	No wildland in City
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.4 – Complete wildfire protection projects	4 – Assist communities in developing Community Wildfire Protection Plans or similar plans	N/A	No wildland in City
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.5 – Encourage proper development practices in the WUI	1 – Adopt the Utah Wildland-Urban Interface Code	N/A	No wildland in City
Wildland Fire	2 – Improve safety from wildfire hazards through planning, protective actions and improved fire response capabilities 2.5 – Encourage proper development practices in the WUI	2 – Define wildland-urban interface and develop digital maps of the WUI	N/A	No wildland in City

Problem Identification: One of the pivotal aspects of disaster response is communication. Without effective communication, relief and rescue operations become chaotic and disorganized, as evidenced by the 2005 Hurricane Katrina event. During that event, communication systems often were inoperable, incompatible or merely went unused because of lack of training (Peterson 2005).

Goal 1 – Improve and maintain communications capabilities for emergency operations. This mitigation strategy applies to all listed hazards.

Objective 1.1 (Priority HIGH): Improve communications capabilities

Action 1: Conduct an inventory and assessment of communications equipment and systems and identify needs.

Time Frame: Ongoing
Estimated Cost: 0
Staff: Fire
Jurisdictions: West Valley: currently switching to the new digital technology and have a completed inventory of all comms devices

Action 2: Conduct training and awareness activities on communications equipment, tools, and systems.

Time Frame: Ongoing
Estimated Cost: minimal
Staff: Fire/EM
West Valley completes monthly tests

Action 3: Establish notification capabilities and procedures for emergency personnel.

Time Frame: Ongoing
Estimated Cost: minimal
Staff: Fire/EM - Dispatch
West Valley uses the VECC callback system for personnel

Objective 1.2 (Priority HIGH): Maintain communications capabilities for critical facilities

Action 1: Time Frame: Ongoing
Estimated Cost: Minimal
Staff: MIS
West Valley City

Action 2: Establish redundancy for dispatch centers and other critical communications systems.

Time Frame: Ongoing
Estimated Cost: $600,000
Staff: MIS
West Valley has this with VECC and also our own 800mhz radio repeater system

Objective 1.3 (Priority HIGH): Conduct Communications Strategic Planning

Action 1: Establish a coordinating group to address long-term communication needs and implementation strategies.

Time Frame: Complete
Funding: N/A
Estimated Cost: N/A
Staff: N/A

Action 2: Acquire, upgrade, and/or integrate communications equipment and systems as determined by coordinating group.

Time Frame: Ongoing
Estimated Cost: $500,000
Staff: Fire/EMS
West Valley City (New Radio Systems).

Problem Identification: Without sufficient knowledge of hazards affecting a jurisdiction, effective and efficient mitigating actions cannot be properly applied. Information on critical and high value infrastructure is also important. Advances in mapping technology and observational techniques have given a significantly clearer vision of hazards and vulnerability. This technology is only effective if utilized with up-to-date data.

Goal 2 – Improve awareness and analysis of hazards. This mitigation strategy applies to all listed hazards.

Objective 2.1 (Priority MEDIUM): Improved quality and access to digital geographic (GIS) hazards data

Action 1: Establish a coordinating group to address geographic data issues.

Time Frame: Ongoing
Estimated Cost: Minimal
Staff: CED/MIS
West Valley GIS is always updating the maps

Action 2: Examine current data availability and sharing capabilities, evaluate needs, and identify shortcomings.

Time Frame: Ongoing
Estimated Cost: $10,000
Staff: Municipal
West Valley City (working on Gap Analysis)

Action 3: Update and expand data on hazards, critical facilities, and critical infrastructure according to assessed needs.

Time Frame: Ongoing
Estimated Cost: $10,000
Staff: Fire/EM
West Valley not currently done but has some items within the Digital Sandbox

Action 4: Provide centralized access to geographic data to emergency planners and responders.

Time Frame: Ongoing
Estimated Cost: Minimal
Staff: GIS
West Valley (working with GIS Department).

Objective 2.2 (Priority MEDIUM): Improve and expand hazard monitoring capabilities.

Action 1: Integrate existing hazard monitoring networks in emergency operations centers. Utilize sensors such as weather stations, stream gauges, seismograph stations, road conditions, etc.

Time Frame: Ongoing
Estimated Cost: $4,000
Staff: Municipal
West Valley City looking at weather strand

Action 2: Identify and implement additional hazard monitoring capabilities.

Time Frame: 2017
Funding: Municipal
Estimated Cost: Unknown
Staff: Municipal

Problem Identification: Certain infrastructure must be able to withstand the most extreme hazard event expected in order to provide coordinated response operations, shelter, and evacuation, if necessary. Some examples of critical infrastructure include police stations, fire stations, schools, water systems, emergency operations centers and major transportation routes.

Goal 3 – Ensure critical facilities can sustain operations for emergency response and recovery. This mitigation strategy applies to all listed hazards.

Objective 3.1 (Priority HIGH): Prevent damage to critical facilities and infrastructure.

Action 1: Utilize GIS to identify facilities and infrastructure at risk.

Time Frame: Ongoing
Estimated Cost: $5,000
Staff: MIS
West Valley still identifying and listing in GIS

Action 2: Assess critical facilities for hazard exposure, structural weaknesses, power, communications and equipment resources and redundancy, and adequate emergency procedures.

Time Frame: 2016
Funding: Municipal
Estimated Cost: $25,000
Education Strategy

Problem Identification: Hazardous events often overcome the resources of any one jurisdiction. An effective measure which ensures adequate response to a hazardous event is mutual-aid agreements specifying resources and assistance from adjoining jurisdictions or state and federal agencies.

Goal 4 – Improve response capabilities through mutual-aid agreements. This mitigation strategy applies to all listed hazards.

Objective 4.1 (Priority MEDIUM): Utilize mutual-aid agreements in accordance with National Incident Management System (NIMS) requirements.

Action 1: Compile inventory of current mutual-aid agreements and memoranda of understanding (MOU) and identify deficiencies.

Time Frame: Complete
Funding: Municipal
Estimated Cost: Minimal
Staff: West Valley

Action 2: Pursue and implement needed mutual-aid agreements.

Time Frame: 2017
Funding: Municipal
Estimated Cost: $5,000
Staff: All
West Valley Fire and Police are done working on other departments

Problem Identification: One of the most cost-effective means of mitigating hazards is through public education. This allows citizens to make informed choices to themselves mitigate hazards affecting them. Education can be especially effective when tied to grant programs.

Goal 5 – Increase citizen safety through improved hazard awareness. This mitigation strategy applies to all listed hazards.

Objective 5.1 (Priority HIGH): Establish a comprehensive public education program.

Action 1: Provide education regarding all natural hazards through live trainings, as well as web-based, print and broadcast media.

Time Frame: 2017
Estimated Cost: Minimal
Staff: EM
West Valley CERT

Action 2: Develop education programs to target specific groups including homeowners, developers, schools and people with special needs.

Time Frame: Complete
Funding: N/A
Estimated Cost: N/A
Staff: N/A
West Valley Cert Training and safety fairs

Action 3: Utilize maps and similar products on City EM website and other media to educate public on areas at risk to hazards.

Time Frame: 2016
Estimated Cost: $5,000
Staff: MIS

Action 4: Coordinate with existing public education programs such as the American Red Cross, Utah Living with Fire, Be Ready Utah, the National Weather Service, etc.

Time Frame: Complete
Funding: N/A
Estimated Cost: N/A
Staff: N/A

Problem Identification: Sometimes hazards require mandated mitigation in the form of ordinances, codes, laws or regulations. Zoning ordinances and building codes are the most common form of mitigation.

Goal 6 – Improve public safety through preventative regulations. This mitigation strategy applies to all listed hazards.

Objective 6.1 (Priority HIGH): Minimize hazard impacts through the adoption of appropriate prevention measures.

Action 1: Establish and enforce appropriate planning, zoning, and building code ordinances.

Time Frame: Complete
Funding: N/A
Estimated Cost: N/A
Staff: N/A
West Valley current codes

Action 2: Ensure current hazard ordinances are available for viewing online.

Time Frame: Complete
Funding: N/A
Estimated Cost: N/A
Staff: N/A

Drought

Problem Identification: Because the Great Salt Lake Valley is a desert climate, there have always been periods of intermittent drought. Measures must be taken to conserve water and to address water shortages for both culinary and agricultural use.

Goal 1 – Reduce and prevent hardships associated with water shortages

Objective 1.1 (Priority HIGH): Limit unnecessary consumption of water throughout the County

Action 1: Continue to encourage water conservation utilizing and promoting outreach material from all water districts in the County.

Time Frame: Ongoing
Funding: Municipal
Estimated Cost: Minimal
Staff: Water Districts

Action 2: Emergency Managers will coordinate with local water districts/public utilities to support ongoing conservation efforts.

Time Frame: 2017
Estimated Cost: Minimal
Staff: Public Works
West Valley Education

Earthquake

Problem Identification: Numerous geologic hazards exist in the West Valley City metropolitan area which can constrain land use. Active fault zones pose the threat of large earthquakes. The major earthquake risk present throughout the Salt Lake County metropolitan area confronts planners with a variety of safety and economic issues that must always be considered prior to land use development.

Goal 1 – Reduce earthquakes losses to infrastructure

Objective 1.1 (Priority HIGH): Encourage retrofit and rehabilitation of highly susceptible infrastructure

Action 1: Identify structures at risk to earthquake damage.

Time Frame: 2016
Estimated Cost: $5,000
Staff: EM
West Valley HAZUS

Action 2: Research feasibility of an incentive program for retrofitting privately-owned buildings, particularly unreinforced masonry.

Time Frame: On-going
Estimated Cost: High Unknown
Staff: EM
West Valley Planning Process

Action 3: Complete seismic rehabilitation/retrofitting projects of public buildings at risk.

Time Frame: Unknown
Funding: Municipal
Estimated Cost: $17,000,000
Staff: Municipal
West Valley City working plan

Objective 1.2 (Priority MEDIUM): Improve public education regarding earthquake risks to unreinforced masonry buildings

Action 1: Provide educational materials to unreinforced masonry home and business owners.

Time Frame: 2016
Funding: Municipal
Estimated Cost: 10,000
Staff: EM

Flooding

Problem Identification: Although located in a semi-arid region, West Valley City is subject to flash flooding due to heavy rainfall and rapid snowmelt, the Jordan River could flood. Our storm sewers have sufficient capacity to handle the excessive runoff, but must be continually maintained to prevent debris from accumulating. Public works agencies have built debris basins, installed stream-bank protection, and regularly dredge stream channels to reduce flood hazards. The Federal Emergency Management Agency (FEMA) has rated floodplains along the Jordan River and its tributaries for expected flood heights and areas susceptible to 100-year flood-frequency inundation have been delineated on County-wide FEMA Flood Insurance Rate Maps (FIRMs). Salt Lake County ordinances require the lowest flood grades (including basements) in new construction to be a minimum of 1 foot (0.3 m) above the appropriate FEMA flood elevation.

Objective 1.2 (Priority MEDIUM): Encourage appropriate flood control measures, particularly in new developments.

Action 1: Determine potential flood impacts and identify areas in need of additional flood control structures.

Time Frame: Ongoing
Funding: Municipal
Estimated Cost: Minimal
Staff: Public Works
West Valley Planning

Action 2: Address identified problems through construction of debris basins, flood retention ponds, energy dissipaters or other flood control structures.

Time Frame: Ongoing
Funding: Municipal
Estimated Cost: $1,000,000
Staff: Public Works
West Valley – Continual with all developments and up- grades to storm water drains near Jordan River.

Objective 1.3 (Priority HIGH): Provide maintenance, repairs and improvements to drainage structures, storm water systems and flood control structures.

Action: Establish maintenance and repair programs to remove debris, improve resistance and otherwise maintain effectiveness of storm water and flood control systems.

Time Frame: Ongoing
Estimated Cost: $75,000 yearly
Staff: Public Works
West Valley City on-going maintenance

Severe Weather

Problem Identification: Severe weather over northern Utah can have a dramatic impact on regional commerce, transportation and daily activity and is a major forecast challenge for local

meteorologists. The region is characterized by intense vertical relief with the Great Salt Lake and surrounding lowlands located near 4,300 ft above mean sea level (MSL) while the adjoining Wasatch Mountains to the east reach as high as 11,000 ft MSL. This relief has major impact on winter storms and results in large contrasts in average annual precipitation.

Goal 1: Reduce threat of loss of life or property due to extreme weather events

Objective 1.1 (Priority LOW): Maintain status as a StormReady Community

Action 1: Maintain Hazardous Weather Operations Plan according to StormReady requirements.

Time Frame: Ongoing
Estimated Cost: Minimal
Staff: EM
Work on Storm Wise Program

Objective 1.2 (Priority MEDIUM): Increase awareness of information services provided by NWS.

Action 1: Meet with NWS representative on an annual basis to receive information on new services and alerts available.

Time Frame: Complete
Funding: N/A
Estimated Cost: N/A
Staff: N/A
West Valley

Action 2: Assist NWS in making other agencies and departments aware of available resources.

Time Frame: 2016
Estimated Cost: 0
Staff: Staff
West Valley *Advise citizens on website

Objective 1.4 (Priority HIGH): Examine the vulnerability of attendees at large event venues to extreme weather events.

Action: Work with the NWS to develop large event venue weather safety and evacuation procedures.

Time Frame: Ongoing
Estimated Cost: $10,000
Staff: EM
West Valley to develop a plan with event areas

7 Plan Maintenance

7.1 Implementation

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development.

7.2 Maintenance

7.2.1 Maintenance Schedule

Periodic monitoring and updates of this Plan are required to ensure that the goals and objectives for the Region are kept current and that local mitigation strategies are being carried out. This Plan has been designed to be user-friendly in terms of maintenance and implementation. This portion of the Plan outlines the procedures for completing revisions and updates. The Plan will also be revised to reflect lessons learned or to address specific hazard incidents arising out of a disaster.

Annual Review Procedures

West Valley City will be responsible to annually review the mitigation strategies described in this Plan, as required by the Utah Division of Emergency Management (UDEM), or as situations dictate such as following a disaster declaration. The process will include the county organizing a Mitigation Planning committee comprised of individuals from organizations responsible to implement the described mitigation strategies. Progress toward the completion of the strategies will be assessed and revised as warranted. Each emergency manager will regularly monitor the Plan and is responsible to make revisions and updates. If the participating jurisdictions or UDEM determines that a modification of the Plan is warranted, an amendment to the Plan may be initiated as described below.

Five Year Plan Review

The entire Plan including any background studies and analysis shall be revised and updated every five years by the participating jurisdictions to determine if there have been any significant changes in the region that would affect the Plan. Increased development, increased exposure to certain hazards, the development of new mitigation capabilities or techniques and changes to Federal or State legislation are examples of changes that may affect the condition of the Plan.

The Natural Hazard Pre-Disaster Mitigation Planning Team, with a potential membership representing every jurisdiction in Salt Lake County, will be reconstituted for the five year review/update process. Typically, the same process that was used to create the original Plan will be used to prepare the update.

7.2.2 Plan Amendments

The Utah DEM State Hazard Mitigation Officer, Local Mitigation Committee, or City Manager of West Valley City, will initiate amendments and updates to the Plan.

Upon initiation of an amendment to the Plan, UDEM will forward information on the proposed amendment to all interested parties including, but not limited to, all affected city or county departments, residents and businesses. Depending on the magnitude of the amendment, the full planning committee may be reconstituted.

At a minimum, the information will be made available through public notice on the West Valley City website www.wvc-ut.gov. The review and comment period for the proposed Plan amendment will last for not less than forty-five (45) days.

At the end of the comment period, the proposed amendment and all review comments will be forwarded to Salt Lake County for consideration. If no comments are received from the reviewing parties within the specified review period, such will be noted accordingly. UDEM will review the proposed amendment along with comments received from other parties and submit a recommendation to FEMA within sixty (60) days.

In determining whether to recommend approval or denial of a Plan amendment request, the following factors will be considered:

- There are errors or omissions made in the identification of issues or needs during the preparation of the Plan; and/or

- New issues or needs have been identified which were not adequately addressed in the Plan; and/or
- There has been a change in information, data or assumptions from those on which the Plan was based.
- The nature or magnitude of risks has changed.
- There are implementation problems, such as technical, political, legal or coordination issues with other agencies.

Upon receiving the recommendation of UDEM, a public hearing will be held. UDEM will review the recommendation (including the factors listed above) and any oral or written comments received at the public hearing. Following that review, UDEM will take one of the following actions:

1. Adopt the proposed amendment as presented.
2. Adopt the proposed amendment with modifications.
3. Defer the amendment request for further consideration and/or hearing.
4. Reject the amendment request.

Implementation through Existing Programs (Including NFIP)

Once the Plan is promulgated, West Valley City will be able to include this Plans information in existing programs and plans. These could include the General or Master Plan, Capital Improvements Plan, Emergency Operations Plan, State Mitigation Plan, City Mitigation Plans. Many of the mitigation actions developed by the cities and counties have elements of mitigation implementation including the National Flood Insurance Program (NFIP), the Utah Wildland-Urban Interface Code, the Building Code Effectiveness Grading System (BCEGS), and Community Rating System (CRS), all of which have been implemented.

The City's Community Development Director oversees enforcement of floodplain management requirements adopted by the City, including regulating new construction in Special Flood Hazard Areas (SFHAs). Floodplain identification and mapping, including any local requests for map updates are also handled by the Community Developer Director.

7.2.3 Maintenance Evaluation Process

It will be the responsibility of the City Manager, to ensure these actions are carried out no later than the target dates unless reasonable circumstances prevent their implementation (i.e. lack of funding availability).

Funding Sources

Although all mitigation techniques will likely save money by avoiding losses, many projects are costly to implement. The WFRC jurisdictions shall continue to seek outside funding assistance for mitigation projects in both the pre- and post-disaster environment. This portion of the Plan identifies the primary Federal and State grant programs for participating jurisdictions to consider, and also briefly discusses local and non-governmental funding sources.

Federal Programs

The following federal grant programs have been identified as funding sources which specifically target hazard mitigation projects:

Title: Pre-Disaster Mitigation Program
Agency: Federal Emergency Management Agency

Through the Disaster Mitigation Act of 2000, Congress approved the creation of a national program to provide a funding mechanism that is not dependent on a Presidential Disaster Declaration. The Pre-Disaster Mitigation (PDM) program provides funding to states and communities for cost-effective hazard mitigation activities that complement a comprehensive mitigation program and reduce injuries, loss of life, and damage and destruction of property.

The funding is based upon a 75% Federal share and 25% non-Federal share. The non-Federal match can be fully in-kind or cash, or a combination. Special accommodations will be made for "small and impoverished communities", who will be eligible for 90% Federal share/10% non-Federal. FEMA provides PDM grants to states that, in turn, can provide sub-grants to local governments for accomplishing the following eligible mitigation activities:

State and local Natural Hazard Pre-Disaster Mitigation Planning
Technical assistance (e.g. risk assessments, project development)
Mitigation Projects
Acquisition or relocation of vulnerable properties
Hazard retrofits
Minor structural hazard control or protection projects
Community outreach and education (up to 10% of State allocation)

Title: Flood Mitigation Assistance Program
Agency: Federal Emergency Management Agency

FEMA's Flood Mitigation Assistance program (FMA) provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes and other structures insurable under the National Flood Insurance Program (NFIP). FMA was created as part of the National Flood Insurance Reform Act of 1994 (42 USC 4101) with the goal of reducing or eliminating claims under the NFIP.

FMA is a pre-disaster grant program, and is available to states on an annual basis. This funding is available for mitigation planning and implementation of mitigation measures only, and is based upon a 75% Federal share/25% non-Federal share. States administer the FMA program and are responsible for selecting projects for funding from the applications submitted by all communities within the state. The state then forwards selected applications to FEMA for an eligibility determination. Although individuals cannot apply directly for FMA funds, their local government may submit an application on their behalf.

Title: Hazard Mitigation Grant Program
Agency: Federal Emergency Management Agency

The Hazard Mitigation Grant Program (HMGP) was created in November 1988 through Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistant Act. The HMGP assists states and local communities in implementing long-term mitigation measures following a Presidential disaster declaration.

To meet these objectives, FEMA can fund up to 75% of the eligible costs of each project. The state or local cost-share match does not need to be cash; in-kind services or materials may also be used. With the passage of the Hazard Mitigation and Relocation Assistance Act of 1993, federal funding under the HMGP is now based on 15% of the federal funds spent on the Public and Individual Assistance programs (minus administrative expenses) for each disaster.

The HMGP can be used to fund projects to protect either public or private property, so long as the projects in question fit within the state and local governments overall mitigation strategy for the disaster area, and comply with program guidelines. Examples of projects that may be funded include the acquisition or relocation of structures from hazard-prone areas, the retrofitting of existing structures to protect them from future damages; and the development of state or local standards designed to protect buildings from future damages.

Eligibility for funding under the HMGP is limited to state and local governments, certain private nonprofit organizations or institutions that serve a public function, Indian tribes and authorized tribal organizations. These organizations must apply for HMPG project funding on behalf of their

citizens. In turn, applicants must work through their state, since the state is responsible for setting priorities for funding and administering the program.

Title: Public Assistance (Infrastructure) Program, Section 406
Agency: Federal Emergency Management Agency

FEMA's Public Assistance Program, through Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, provides funding to local governments following a Presidential Disaster Declaration for mitigation measures in conjunction with the repair of damaged public facilities and infrastructure.

The mitigation measures must be related to eligible disaster related damages and must directly reduce the potential for future, similar disaster damages to the eligible facility. These opportunities usually present themselves during the repair/replacement efforts.

Proposed projects must be approved by FEMA prior to funding. They will be evaluated for cost effectiveness, technical feasibility and compliance with statutory, regulatory and executive order requirements. In addition, the evaluation must ensure that the mitigation measures do not negatively impact a facility's operation or risk from another hazard.

Public facilities are operated by state and local governments, Indian tribes or authorized tribal organizations and include:

- Roads, bridges & culverts
- Draining & irrigation channels
- Schools, city halls & other buildings
- Water, power & sanitary systems
- Airports & parks

Private nonprofit organizations are groups that own or operate facilities that provide services otherwise performed by a government agency and include, but are not limited to the following:

- Universities and other schools
- Hospitals & clinics
- Volunteer fire & ambulance
- Power cooperatives & other utilities
- Custodial care & retirement facilities
- Museums & community centers

Title: Small Business Administration (SBA) Disaster Assistance Program
Agency: U.S. SBA

The SBA Disaster Assistance Program provides low-interest loans to businesses following a Presidential disaster declaration. The loans target businesses to repair or replace uninsured disaster damages to property owned by the business, including real estate, machinery and equipment, inventory and supplies. Businesses of any size are eligible, along with non-profit organizations.
SBA loans can be utilized by their recipients to incorporate mitigation techniques into the repair and restoration of their business.

Title: Community Development Block Grants
Agency: US Department of Housing and Urban Development

The Community Development Block Grant (CDBG) program provides grants to local governments for community and economic development projects that primarily benefit low- and moderate-income people. The CDBG program also provides grants for post-disaster hazard mitigation and recovery following a Presidential disaster declaration.

Funds can be used for activities such as acquisition, rehabilitation or reconstruction of damaged properties and facilities and for the redevelopment of disaster areas.

State Programs

Local

Local governments depend upon local property taxes as their primary source of revenue. These taxes are typically used to finance services that must be available and delivered on a routine and regular basis to the general public. If local budgets allow, these funds are used to match Federal or State grant programs when required for large-scale projects.

Non-Governmental

Another potential source of revenue for implementing local mitigation projects are monetary contributions from non-governmental organizations, such as private sector companies, churches, charities, community relief funds, the American Red Cross, hospitals, land trusts and other non-profit organizations.

Paramount to having a Plan deemed to be valid is its implementation. There is currently no new fiscal note attached to the implementation of this Plan.

7-2-4 Continued Public Involvement

Throughout the planning process, public involvement has been and will be critical to the development of the Plan and its updates. The Plan will be available on the West Valley City website, to provide opportunities for public participation and comment. The Plan will also be available for review at the offices of West Valley City.

Salt Lake County Emergency Management has been designated as the lead agency in preparing and submitting the Salt Lake County Natural Hazards Pre-Disaster Mitigation Plan, which includes coverage for all incorporated cities and counties within Salt Lake County. With limited resources, however, it becomes difficult to both identify and to individually contact the broad range of potential agencies that may stand to benefit from the Plan. This being the case, we have established the following course of action

STEP 1. SLCOEM will publicly advertise all hearings, requests for input and meetings directly related to the Natural Hazard Pre-Disaster Mitigation Planning process. Meetings of the Mitigation Planning Team where Plan items are discussed and where actions are taken will not receive special notifications as they are already advertised according to set standards. All interested parties are welcome and invited to attend such meetings and hearings, as they are public and open to all.

STEP 2. The AOG has established a mailing list of many local agencies and individuals that may have an interest in the Natural Hazard Pre-Disaster Mitigation Plan. Each identified agency or person will be mailed a notice of the hearings and open houses.

STEP 3. Comments, both oral and written, will be solicited and accepted from any interested party. Comments, as far as possible, will be included in the final draft of the Plan; however, SLCOEM reserves the right to limit comments that are excessively long due to the size of the Plan.

STEP 4. Specific to risk assessment and hazard mitigation, needs analysis, and capital investment strategies, SLCOEM will make initial contact and solicitation for input from each incorporated jurisdiction within the region. All input is voluntary. Staff time and resources do not allow personal contact with other agencies or groups, however, comments and strategies are welcomed as input to the planning process from any party via regular mail, FAX, e-mail, phone call, etc. In addition, every public jurisdiction advertises and conducts public hearings on their planning, budget, etc. where most of these mitigation projects are initiated. Input can be received from these prime sources by the region as well.

STEP 5. The following policies will guide SLCOEM staff in making access and input to the Natural Hazard Pre-Disaster Mitigation Plan as open and convenient as possible:

Participation
All citizens of the region are encouraged to participate in the planning process, especially those who may reside within identified hazard areas. SLCOEM will take whatever actions possible to accommodate special needs of individuals including the impaired, non-English speaking, persons of limited mobility, etc.

Access to Meetings

Adequate and timely notification to all area residents will be given as outlined above to all hearings, forums, and meetings.

Integration of data, information, and mitigation goals and action plans:

West Valley City will integrate mitigation strategies into its building codes, the planning commission, and the actions of the City Council and other relevant agencies by education by the Emergency Manager during daily, weekly, and monthly city and public meetings.

Access to Information

Citizens, public jurisdictions, agencies and other interested parties will have the opportunity to receive information and submit comments on any aspect of the Natural Hazards Pre-Disaster Mitigation Plan, and/or any other documents prepared for distribution by SLCOEM that may be adopted as part of the Plan by reference. SLCOEM may charge a nominal fee for printing of documents that are longer than three pages.

Technical Assistance

Residents as well as local jurisdictions may request assistance in accessing the program and interpretation of mitigation projects. SLCOEM staff will assist to the extent practical, however, limited staff time and resources may prohibit staff from giving all the assistance requested. SLCOEM will be the sole determiner of the amount of assistance given all requests.

Public Hearings

The AOG will plan and conduct public hearings according to the following priorities:

Hearings will be conveniently timed for people who might benefit most from mitigation programs.
Hearings will be accessible to people with disabilities (accommodations must be requested in advance according to previously established policy).
Hearings will be adequately publicized. Hearings may be held for a number of purposes or functions including to: Identify and profile hazards, Develop mitigation strategies, and Review Plan goals, performance and future Plans.

Future Revisions:

Future revisions of the Plan shall include:
Expanded vulnerability assessments to include flood and dam failure inundation.
Continue the search for more specific mitigation actions.
An analysis of progress of the Plan as it is revised.
Expanded look into how the identified natural hazards will affect certain populations including the young and elderly. Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning.

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